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ABSTRACT

Background: The human genome project has affirmed the importance of non-genetic factors in human development. Attachment style is considered to be a diathesis for psychopathology and an important determinant regarding interpersonal functioning. Epidemiological research has indicated that there is significant aetiological continuity between symptoms of schizotypy and clinical symptoms of schizophrenia. Limited research has investigated the association between attachment and schizotypy.

Aim: To investigate the predictive association between schizotypy and attachment styles, interpersonal functioning and depression within a stress-diathesis model of schizophrenia.

Design and Methodology: A quantitative cross-sectional within group design using a clinical sample was employed. Hierarchical linear regressions and path models were computed to investigate the hypothesised predictive association between the variables.

Main finding: The best predictor of schizotypy is understood in the context of an interaction between developmental vulnerability factors (attachment styles) and current stressors (level of interpersonal functioning). Depression mediated the impact of interpersonal functioning on schizotypy but was not a significant solo predictor of schizotypy.

Discussion: The potential implications of the findings are discussed in regard to a dimensional stress diathesis model of schizophrenia. The robustness of the research design employed is discussed and suggestions for future research made.

Word Count: 195

CHAPTER ONE – INTRODUCTION

1.1.1 Overview of the Introduction Chapter

This study will investigate the association between schizotypy and attachment using a clinical sample. In this study it will be assumed that schizotypy exists as a sub-clinical dimensional manifestation of schizophrenia. The association of this construct as a vulnerability factor in schizophrenia will be examined in regard to attachment, interpersonal functioning and depression within a stress-diathesis model. This chapter will provide the background research and the scientific justification for the approach taken in this study.

1.1.2 Categorical and Dimensional Approaches to Psychological Disorders

Categorical classifications of mental disorders assume that psychological disorders exist as distinct illnesses that are clearly demarcated into discrete homogenous categories and are qualitatively distinct from non-clinical phenomenon (van Os, 1999). The theoretical assumptions of this approach are fundamentally different to the assumptions used to conceptualise psychological disorders using a dimensional framework. In this regard, dimensional approaches assume that psychological disorders exist as a continuum of continuously distributed personality characteristics ranging in severity from non-clinical psychological phenomenon to clinical disorders (Kraemer *et al., 2004;* van Os, 1999). Within a dimensional conceptual framework, determinations regarding the presence or absence of a mental disorder are based on the quantification of clinical symptoms of disorder and the distinction between clinical and non-clinical psychological phenomenon is assumed to be quantitative rather than qualitative (Kraemer *et al., 2004*).

The classification of psychological disorders as either categorical or dimensional is misleading and unhelpful. In this regard, psychological disorders are categorical, to the extent that the disorder is either present or not, and dimensional in that all disorders vary

in regard to severity of impairment (Kraemer *et al.,* 2004). However, there is ongoing debate regarding the comparative utility of categorical and dimensional classification systems for psychological disorders (Brown & Barlow, 2005). Presently, the preferred model of taxonomy for psychological disorders is categorical (Brown & Barlow, 2005) and both the Diagnostic Statistical Manual – IV (American Psychiatric Association, 1994) and International Classification of Diseases 10 (World Health Organisation, 1992) classify mental disorders using this system. From a clinical perspective, the use of categorical systems allows definitive affirmations regarding the presence or absence of a mental disorder to be made. Such determinations are required ethically to make routine clinical decisions, for example to justify a therapeutic intervention or psychiatric hospitalisation (Kraemer *et al., 2004*). From a research perspective, the use of a categorical system of taxonomy has produced a shared modus operandi for researchers that has generated scientifically valid information on the aetiology, course and treatment for psychological disorders (Kamphuis & Noordhof, 2009).

There are well documented limitations in regard to the use of the categorical systems that are employed in DSM-IV (Brown & Barlow, 2005). For example, the diagnostic criteria for anxiety and mood disorders have been criticised for being unable to provide sufficient clarity in regard to the level of clinically significant distress that is required to distinguish between sub-threshold and threshold levels for these disorders. The high number of NOS (Not Otherwise Specified) diagnoses that are reported in clinical practice, particularly in regard to Generalised Anxiety Disorder (GAD) and Major Depressive Disorder (MDD), is cited as evidence to support this view (Brown & Barlow, 2005). The categorical criteria in the DSM-IV systems have also been criticised for not having sufficient scope to account for co-morbid diagnoses (Kamphuis & Noordhof, 2009). In this regard, the hierarchical criteria and differential diagnostic rules of the DSM-IV can significantly inhibit co-morbid diagnosis (Brown & Barlow, 2005). For example, the current diagnostic criteria specify that GAD cannot be diagnosed if the symptoms of this disorder occur exclusively during a mood disorder (Brown & Barlow, 2005).

From a research perspective, the use of categorical conceptualisations of mental disorders has been criticised as being inadequate to encompass the complete spectrum of personality pathology (Brown & Barlow, 2005; Verheul, 2005). Critics of categorical approaches assert that conforming attention to clinical presentations that are only

consistent with formal clinical diagnosis criteria restrains research in significant ways (Widiger & Samuel, 2005). The assertion by Clark (1993) that "*the anti–scientific bias of the familiarity or tradition–based arguments, which bear a disturbing resemblance to the old story of searching for a lost key under the lamppost because the light is better there*" is terse summation of this view (p. 101). Furthermore, research using categorical conceptualisations differs from research employing dimensional conceptualisations of psychological disorders in that the former does not use ordinal scores. However, there is a consensus that the use of ordinal scores are more suited for longitudinal research (De Clercq, *et al., 2009)* and increase the power of hypothesis testing (Chumura Kraemer *et al.,* 2004; Kamphuis & Noordhof, 2009).

The potential utility of a dimensional approach to psychological disorders has long been acknowledged by researchers and clinicians (Widiger, 1992). The view that dimensional classifications should be assimilated into future diagnostic systems has become increasingly more acceptable in recent years (De Clercq *et al., 2009;* Kamphuis & Noordhof 2009; Verheul 2005). Presently, the crucial issue is not in regard to whether dimensional approaches should be incorporated into future diagnostic systems but rather how best to facilitate this. In support of this view, Verheul (2008) states "*There are few, if any, authors who object to this. However, there is still considerable debate about what dimensional system is most valid and useful*" (p. 284). Advocates of this view generally take the position that categorical conceptualisations of mental disorders can be significantly improved if dimensional cut offs are incorporated. It is anticipated that by doing so the perceived disadvantages of categorical diagnostic will be moderated (Verheul, 2005).

Currently, the main reason cited by the authors of DSM IV (American Psychiatric Association, 1994) for not incorporating dimensional classifications into the formal taxonomy of the next addition of the manual was "*there is yet no agreement on the choice of the optimal dimensions to be used for classification purpose*" (p. xxii). From this perspective, the key challenge is to clarify how both approaches may be integrated to identify optimal dimensional cut-offs within categorical classification systems. The demarcations are not obvious and the employment of research methodologies allied to guided theoretical discussion regarding practice based evidence will both be necessary for progress to occur.

In this study schizophrenia will be conceptualised as a dimensional construct. The disorder will be assumed to exist on a continuum of severity ranging from non-clinical schizotypic symptoms to clinical disorder. Research evidence in support of this approach will be reviewed in the following sections.

Summary: There are advantages and disadvantages regarding the use of both dimensional and categorical nosology systems to classify psychological disorders. There is ongoing debate regarding the comparative utility of each classification system.

1.2.1 Schizophrenia

The cardinal symptoms of schizophrenia as delineated in DSM-IV are typically conceptualised into three broad categories, namely positive, negative and disorganised symptoms. Positive symptoms involve impairments in regard to reality testing and typically involve delusions and hallucinations (American Psychiatric Association, 2006). Negative symptoms are associated with impairments in affect and conative domains with associated deficits reported in regard to abulia, alogia, anhedonia, avolition, and apathy (Tandon *et al.,* 2008). Disorganised symptoms are more closely related to positive symptoms but have been shown to independently exist from this category (American Psychiatric Association, 2006). Deficits in this domain are indicated by formal thought disorder which is characterised by dissolution of logical and progressive thinking and behaviour (Tandon *et al.,* 2009)[1]. These core symptoms must persist for a minimum period of one month and with further indicators of the disorder to persist for at least a six month period. These symptoms must not be attributable to mood disorder, schizoaffective disorder, substance abuse, a general medical condition or developmental disorder (American Psychiatric Association, 1994).

Saha *et al*. (2005) completed a systematic review that included 188 studies from 46 countries. Based on a meta-analysis using 24 of these studies an estimated lifetime prevalence rate of 4.6 per 1000, with confidence intervals ranging from1.9 - 10 per 1000, was reported. In regard to prevalence McGrath *et al*. (2004) conducted a meta-analysis

[1] See Appendix I

that included all service provision published studies from 1965 to 2001. This study included data from 55 studies and from 33 countries. A median incident rate of 15.2/100,000 (confidence intervals 8 – 43 per 100,000) per year was reported. An elevated level of risk was noted in regard to migration, urban residency and being male (McGrath *et al.*, 2004) but was not noted to vary according to either country or socioeconomic status of the country (Saha *et al.*, 2006). However, this study is considered to provide a conservative estimate of incidences of schizophrenia since it only included service provision studies and therefore only recorded incidence of those who present to services with schizophrenia.

Schizophrenia is assumed to follow a progressive trajectory (Tandon *et al., 2009*) that involves a premorbid, prodromal and psychotic phase. The demarcation between these stages is imprecise (Tandon *et al.,* 2009) and these phases are not present in all incidences of schizophrenia, for example onset may be abrupt or precipitous. The '*premorbid*' is typically characterised by normative functioning but significant life stressors or impairments in domains of academic and social functioning may also occur in this period (American Psychiatric Association, 2006). The '*prodromal*' stage can range from months to years in duration (Klosterkötter *et al*., 2008) and is characterisied by the progressive deterioration of psychotic symptoms. The '*psychotic*' stage is characterised by the presence of overt psychotic symptoms in the domains discussed above. The age of onset typically occurs between 15 to 45 years (American Psychiatric Association, 2006).

Schizophrenia is a debilitating psychiatric disorder (Johns & van Os, 2001) and outcome is multidimensional (Tandon *et al*., 2009) with varying degrees of recovery observed (Tandon *et al*., 2009). Of those who attain a diagnosis of schizophrenia approximately 10 - 15% of this cohort remain chronically psychotic across the lifespan (Hegarty *et al*., 1994), 10 - 15% of this group do not relapse (Fenton & McGlasham, 1991) while the remainder experience significant periods of recovery and remission (Andreasen *et al.*, 2005). Positive symptoms are assumed to become less prominent over time whilst negative symptoms become more pronounced (Tandon *et al*., 2009). Positive outcome is associated with superior general premorbid function, residency in non-western countries (Harrison *et al*., 2001), being female, absence of substance abuse and late age onset (Tandon *et al.,* 2008).

Individuals with schizophrenia are reported to exhibit increased mortality rate, double in comparison to the general population (Parks, *et al., 2006).* The factors most commonly cited to account for this discrepancy are suicide and comorbid medical conditions (Tandon *et al*., 2008). In addition to the personal affects of stigmatization (Read *et al*., 2006) it is commonly accepted that the impact of schizophrenia has a significant impact on the quality of life of both the individual, their social supports and their family (Tandon *et al*., 2009). Direct costs to society are assumed to be high as a consequence of reduced efficiency, elevated likelihood of unemployment and/or homelessness (Rosenheck *et al*., 2006) and high medical costs associated with the provision of care (Kooyman *et al.*, 2007).

The current study will aim to contribute to the expanding evidence base regarding the role of interpersonal functioning in schizophrenia by investigating the association between attachment and schizotypy. The assumption that sub-clinical schizotypy is of relevance to schizophrenia is dependent on the epidemiological validity of a dimensional conceptualisation of schizophrenia. In the following sections research evidence will be reviewed to examine the status of this assumption.

Summary: Schizophrenia is a potential debilitating disease that can have a significant impact on both a micro level, in regard to the quality of life of those who experience it, and on a macro level in regard to direct costs to society.

1.3.1 Schizophrenia as a Categorical Disorder

The DSM-IV (American Psychiatric Association, 1994) criteria for schizophrenia are considered to be the most valued and most frequently applied criteria for this disorder (Mezzich, 2002). The DSM IV manual clearly indicates that no assumption is made with regard to whether schizophrenia exists as either a categorical or dimensional construct. This withstanding, the diagnostic criteria imply that the disorder is categorical in that the disorder is both qualitatively distinct from normal health and other affective disorders, such as schizoaffective disorder and manic depression (Allardyce, *et al.*, 2007).

The validity of the DSM-IV diagnostic criteria for schizophrenia is justified on the basis of research evidence that indicates that these criteria relate to a disorder that is stable over

time (Baca-Garcia *et al*., 2007) and which has high inter-rater diagnostic reliability (Jakobsen *et al*., 2006).[2] [3] However, since the inception of the diagnosis the criteria have been consistently revised to improve the construct validity of the disorder. In this regard, the original criteria proposed by Kraepelin have been reformulated by Bleuler, Schneider, DSM III (American Psychiatric Association, 1987) and DSM IV (American Psychiatric Association, 1994) and further revisions are expected in DSM – V (Bentall, 2006). Presently, there is ongoing concern regarding the construct validity of the diagnosis of schizophrenia as a categorical construct (van Os, 2003). These concerns relate primarily to the homogeneity of the disorder as a distinct disorder separate from other disorders and as a disorder distinct from normal health. The evidence reviewing this subject matter will be discussed next.

Summary: The categorical conceptualisation of schizophrenia in DSM-IV implies that this disorder is distinct from both other affective disorders and '*normal health'***.**

1.3.2 Schizophrenia as a Categorical Disorder distinct from Affective Disorders

The current DSM – IV diagnostic criteria for schizophrenia has been criticised for failing to adequately demarcate schizophrenia from the affective disorders (Dutta *et al*., 2007). For example, in regard to bipolar disorders there is strong evidence to indicate that schizophrenia does not exist as a categorical disorder distinct from this group of disorders. Firstly, neuropharmacological research studies indicate that dysfunctional dopamine deregulation is involved in both schizophrenia and bipolar disorders (Dutta *et al*., 2007). Secondly, neuroimaging research indicates that both of these disorders share anatomically similar white matter abnormalities (McDonald *et al*., 2005). This research, allied to practice based evidence that indicates antipsychotic medication to have

[2] The opinion that diagnosis of schizophrenia has high inter-rater reliability is one that is not universally accepted (Bentall, 2006).

[3] Research evidence that indicates high clinical reliability does not necessarily infer nosological validation, namely that the diagnosis has construct validity (Allardyce *et al*., 2007; Dutta *et al*., 2007).

pervasive effects in both conditions, suggests a common neurophysiological aetiology in both disorders (Dutta *et al*., 2007).

Evidence from research genetics does not support the dichotomous classification of affective disorders (Craddock & Owen, 2007). Firstly, family studies indicate that incidences of bipolar disorders, schizoaffective disorder and schizophrenia occur in families at a rate significantly higher than would be expected by chance alone (Craddock *et al.,* 2005). Secondly, data obtained from twin studies indicate common genetic vulnerability in both bipolar disorders and schizophrenia (Craddick & Owen, 2007). Thirdly, linkage studies of schizophrenia to schizoaffective disorder (Hamshere *et al*., 2005) and bipolar disorders (Craddock *et al.,* 2005) have implicated similar chromosal regions.

Personality research that has used factor analysis to analyse psychopathological dimensions in functional psychosis have produced a five factor solution involving factors mania, depression, disorganised, positive and negative (Allardyce, *et al.,* 2007). The application of the five factor solution to functional psychosis indicated that a shared symptom dimension projection was present across all affective diagnose (Dikeos *et al.*, 2006). Variation between psychotic disorders/presentations appear to occur as a consequence of the differences in profiles with regard to both how pronounced the symptoms are on each of these core dimensions and the combination of these dimensions. For example, patients with a manic depression exhibit more pronounced symptoms of mania and depression contrasting with schizophrenia presentations where dimensions positive, negative and disorganised are more prominent (Dikeo *et al*., 2006). These studies indicate that there are underlying latent dimensions indicative of quantitative rather than qualitative differences between psychotic disorders (Allardyce, *et al.,* 2007). This finding allied to the research discussed above does not indicate that there is a clear discontinuity between schizophrenia and other affective disorders.

Summary: Strong research evidence exists to support the thesis that schizophrenia does *not* exist as a categorical disorder that is clearly demarcated from other affective disorders.

1.3.3 Schizophrenia as a Categorical Disorder distinct from 'Normal Health'

The primary assumption that is implicit in a categorical conceptualisation of psychosis is that the psychosis phenotype exists as a dichotomous entity that is qualitatively distinct from normal health (van Os, 2003). The epidemiological corollary of this assumption is that the prevalence and incidence of psychosis disorder will be greater than the prevalence and incidence of the symptoms of the disorder (van Os, 2009). The validity of this assumption can be examined by investigating the degree to which a psychosis continuum exists in the general population. However, two distinct paradigms have been used to investigate the distribution of psychotic symptoms in the general population, namely the '*same symptom'* approach and the '*Schizotypy'* approach (van Os, 2003). The '*same symptom'* approach measures the prevalence of symptoms observed in patients with psychotic disorders in the general population. Conversely the '*Schizotypal'* approach uses the concept of schizotypy to measure sub-clinical symptoms of schizophrenia in the general population.

Green *et al.* (2008) defined schizotypy is a '*multidimensional construct referring to a range of biologically determined personality factors, reflected in cognitive style and perceptual experiences that manifest as sub-clinical levels of psychotic-like behaviours in otherwise psychological healthy individuals'* (p.2*).* Three distinct theoretical models of schizotypy personality have been proposed since 1960 (Green *et al.*, 2008), namely the '*Totally Dimensional Model'* (TDM), the '*Quasi-Dimensional Model*' (QDM) and the *'Fully Dimensional Model'* (FDM). There are subtle theoretical differences in regard to how these models conceptualise schizotypy, particularly in relation to the hypothesised association between schizotypy to Schizotypal Personality Disorder and schizophrenia (Green *et al.*, 2008).

The TDM (Eysenck & Eysenck, 1976) postulated that there is a complete and uninterrupted continuum between psychotic and non-psychotic experiences. Within this model, individuals experiencing psychotic experiences occupy the extreme end of Eysenck's '*normality-psychosis*' continuum. Eysenck incorporated the Pavlovian construct of '*nervous types*' whereby differences in the capacity of the central nervous

system to withstand robust stimulation determined individual variation in regard to personality/temperament. The TDM has been criticised for failing to adequately distinguish the qualitative differences between psychotic and non-psychotic patients (Claridge 1997a).

The QDM (Meehl, 1990) conceptualises schizotypy as a categorical psychotic illness that represents a less overtly expressed manifestation of schizophrenia (Meehl, 1990). In regard to symptom expression the personality manifestations observed in schizotypy, namely interpersonal deficits, cognitive-perceptual aberrations and eccentricities, were postulated to be less severe but broadly equivalent to those observed in schizophrenia. Within this model schizotypy personality traits were determined by a genetically endowed schizotaxic brain (Meehl, 1990). It was hypothesisied that the transition from schizotypy to schizophrenia was determined by the interaction of the schizotaxic brain in concert with other polygenetic personality traits and environmental factors (Meehl, 1990).

The FDM of schizotypy was conceptualised as a cluster of personality traits, characterised by distinct cognitive styles and perceptual aberrations that occur as a consequence of genetic and environmental factors. Within this model schizophrenia was hypothesisied to occur as a consequence of the breakdown of otherwise normal and adaptive functioning biological systems. The FDM (Claridge, 1997b) assimilates aspects from both the QDM and TDM. In this regard, the FDM postulated that schizotypic traits were normally distributed throughout the general population as was proposed in the TDM. However, unlike the TDM but consistent with the QDM, the FDM assumes that there is a clear demarcation between health and schizophreniform disorders[4]. In this regard, within the FDM model schizophrenia was postulated to be independent from the continuously distributed schizotypy, on a separate graded continuum ranging from SPD to schizophrenia.

The distribution of clinical and non-clinical psychotic symptoms in the general population is noted to vary according to whether the '*same symptom'* or '*Schizotypal'*

[4] These include the DSM–IV (American Psychiatric Association, 1994) criteria for Paranoid Personality Disorder, Schizoptypal Personality Disorder, Schizoaffective Disorder and Schizophrenia.

approach' is used. This withstanding, both approaches are assumed to be assessing the same phenomenon, namely sub-clinical symptoms of psychosis/schizophrenia. However, as noted by van Os (2003), '*Normalised instruments tend to yield normal distributions, whereas instruments with items closer to pathology tend to have very skewed distributions. Therefore, as far as the prevalence argument is concerned, studies assessing the prevalence of psychotic symptoms themselves, rather than variably defined attenuated experiences may be more useful'*(p. 244). For this reason, it would seem that the most accurate way to assess the prevalence of symptoms of sub-clinical schizophrenia/psychosis[5] in the general population is to review studies that have used the '*same symptom*' approach. Therefore, in the following section studies that have used this approach to assess sub-threshold symptoms of schizophrenia/psychosis in the general population will be reviewed. The status of the findings of these studies will also be discussed in regard to the association between sub-clinical symptoms schizophrenia/psychosis to symptoms of clinical schizophrenia in regard to distributional validity, demographic, aetiological validity and predictive validity.

Summary: Both the '*schizotypy*' and '*same symptom*' approach can be used to measure sub-clinical symptoms of schizophrenia/psychosis.

1.3.4 Psychosis as a Continuum - Epidemiological Evidence

Van Os *et al.,* (2000) investigated the prevalence of symptoms of psychosis in the general population. The sample used in this study was generated from the Netherlands Mental Health Survey and Incidence Study (NEMESIS) and consisted of 7076 individuals aged 18-64 years old. Trained lay interviewers used the CIDI (Composite International Diagnostic Interviewer version) (Andrews & Peters, 1998) to assess for the presence of psychotic symptoms. Participants who indicated at least one positive rating on any of the 17 core psychosis items on CIDI were re-interviewed by a senior registrar in psychiatry. The relevant questions from the Structured Clinical Interview for DSM-III-R (SKID) (First *et al.,* 1995) were used to assess for symptoms of psychosis in the follow-up interviews.

[5] Furthermore, based on the above discussion the distinction between schizotypal models and consequently how to measure them as constructs in the general population requires further clarification.

The primary clinical finding of this study indicated that there was a discrepancy in the sample between the prevalence of psychotic symptoms (17.5%) and the number of participants (2.1%) who qualified for a formal DSM-III-R diagnosis of non-affective psychosis. On consideration of this finding the researchers concluded that the psychosis phenotype is likely to be fifty times more prevalent than the current medical conceptualisation. Furthermore, a positive association between symptoms of sub-clinical psychosis and variables '*lower age*', '*single marital status',* '*urban dwelling*', '*lower level of education', 'lower quality of life' depressive symptoms'* and *'blunting of affect'* was observed. The association between these variables to both symptoms of sub-clinical psychosis and schizophrenia was noted to be broadly similar.

In regard to the methodological strengths of the study the following should be noted. Although the sample was considered representative in relation to urbanisity, gender and marital status it was under represented in regard to the age cohort 18-24 years and did not include individuals who were living in institutions. Furthermore, the association between sub-clinical psychosis and the aforementioned determinants could have been enhanced had the CIDI been complemented with other assessment tools that assessed for other risk factors. This withstanding, these findings suggest that a significant degree of continuity may exist between sub-clinical psychosis and schizophrenia.

Johns *et al.* (2004) investigated the prevalence and correlates of psychotic symptoms in a sample of 8580 participants aged 16-74 years old. Information regarding physical and mental health, substance use, significant life events and socio demographic status was obtained during interviews. The presence of psychotic symptoms during the preceding year was assessed using the Psychosis Screening Questionnaire (PSQ): Participants who indicated a positive response on at least one of the four psychosis criteria were interviewed for a second time to further establish the prevalence of psychotic symptoms.

Results indicated that 5.5% of the sample has shown evidence of psychotic symptoms in the absence of a diagnosis for a formal psychotic disorder. The prevalence of psychotic symptoms in this study is significantly lower to that reported by van Os *et al.* (2000). The discrepancy in the findings is likely to be understood in the context of the methodologies employed. In this regard, Van Os *et al.* (2000) assessed *lifetime* prevalence and used the

CIDI which assesses 17 psychotic items. This contrasts with the Johns *et al*. (2004) study that assessed *annual* prevalence of psychotic symptoms and used the PSQ that contains *five* psychotic items. In regard to the correlates of self-reported psychotic experiences, an association was reported in relation to substance misuse, experiences of victimisation, stressful life events, reduced intelligence quotient and neurosis. These risk factors appear broadly similar to those observed in regard to schizophrenia. However, since a cross sectional methodology was employed causality or the direction of this relationship cannot be determined. Overall the results of this study further support the view that a continuum of psychosis exists in the general population and offer tentative support that the risk factors commonly reported in regard to schizophrenia are similar to those commonly reported for sub-clinical psychosis.

Rossler *et al*. (2007) investigated the continuity and determinants of psychotic experiences in the general population. Participants completed the SCL-90-R and a semi structured interview at ages 20/21, 23, 28, 30, 35 and 41. The sample originally consisted of 591 participants but as a consequence of attrition rates was reduced to 372 at the final assessment time. The main findings from this study were as follows. Firstly, a significant proportion of the sample affirmed to experiencing one or more of the 16 self-reported symptoms as assessed using the scales *"psychoticism"* and *"paranoid ideation"*. For example, in relation to psychoticism, when the "*a little bit*" cut off criteria was applied 38%[6] affirmed that "*Someone else can control your thought"* at age 20/21. Similarly, in regard to paranoid ideation, 27% endorsed the statement "*Feeling others are to blame for your troubles"* at age 20/21. Secondly, with regard to the continuity of these symptoms it appears that the percentage of participants who endorsed these statements declined as age increased. In this regard only 15.2% and 20.6% of the sample reaffirmed the above statements at age 40/41. This appears to be consistent with the course and stability of symptoms in schizophrenia. Thirdly, factor analysis was applied to symptom scores obtained from the SCL90-R. This analysis revealed two distinct dimensional symptom constellations. The first more closely resembled the cardinal symptoms of schizophrenia and was predicted by cannabis in a dose-response relationship over the 20 years of the study. This finding is consistent with research reviewed that indicates cannabis use is an antecedent for psychotic disorders (Zammit & Lewis, 2004). The second dimensional

[6] Percentages have been reweighted to offset sample stratification of the sample.

cluster showed closer affinity to the DSM-IV (American Psychiatric Association, 1994) criteria for Schizotypal Personality Disorder. Longitudinal patterns to determine determinants for this cluster indicated that interpersonal conflict and childhood neglect were associated with the development of these symptoms. As will be discussed below this finding is of particular relevance to the current research. Furthermore, it is consistent with research that has placed increased emphasis on ecological factors in schizophrenia (Read *et al. 2005*), particularly, childhood trauma (Bak *et al*., 2005). Finally, both dimensions showed strong associations to negative symptoms although slight variation was observed where schizotypal was associated with interpersonal problems. The longitudinal methodology employed in the current study covered the crucial onset and persistence period of psychosis and should be considered a strength of the current study. In regard to potential weaknesses the current study used the SCL-90 which is prone to self-bias or minimisation and does not assess all symptoms for psychotic disorders as delineated by DSM. Furthermore, the attrition rates were high although this is likely to be of minimal significance since no notable difference in regard to psychiatric traits was noted between dropouts and those who completed follow up interviews.

Van Os *et al*. (2009) completed a systematic review and meta-analysis to investigate the epidemiological validity of the psychosis continuum in regard to distributional validity, demographic validity, aetiological validity and predictive validity. Data were 47 papers dating from 1957 to 2007 that met the inclusion criteria of the study. The main result of the study indicated that the overall median prevalence (5%; IQR[7] 1.9 – 14.4%) and incidence (3%; IQR 1.1-8.6%) rates for sub-clinical psychosis were significantly elevated to the prevalence and incidence of the clinical phenotype of psychotic disorders. Further analysis indicated that 75–90% of psychotic experiences are temporary and did not develop into presentations that warranted clinical intervention/diagnosis (van Os *et al., 2009*). These findings were inconsistent with the propositions of a categorical model of psychosis that predicted that the incidence and prevalence of the disorder would be greater than the incidence and prevalence of symptoms of the disorder.

In regard to demographic validity the findings of this study indicated that variables age, gender, relationship status, unemployment and ethnicity, associated with incidences of

[7]IQR refers to Inter Quartile Range

schizophrenia were similar to the demographic variables associated with sub-clinical psychosis. In respect of aetiological validity, the non-genetic risk factors associated with incidences of schizophrenia, such as childhood trauma and alcohol/drug use and genetic risk factors were observed to be similar to those observed in relation to sub-clinical manifestations of psychosis. Finally, in relation to predictive validity, the overall rate of sub-clinical psychosis was observed to predict clinical psychotic disorder. The results of this meta-analysis provide strong support for the epidemiological validity of a psychosis continuum in regard to distributional validity, demographic validity, aetilogical validity and predictive validity.

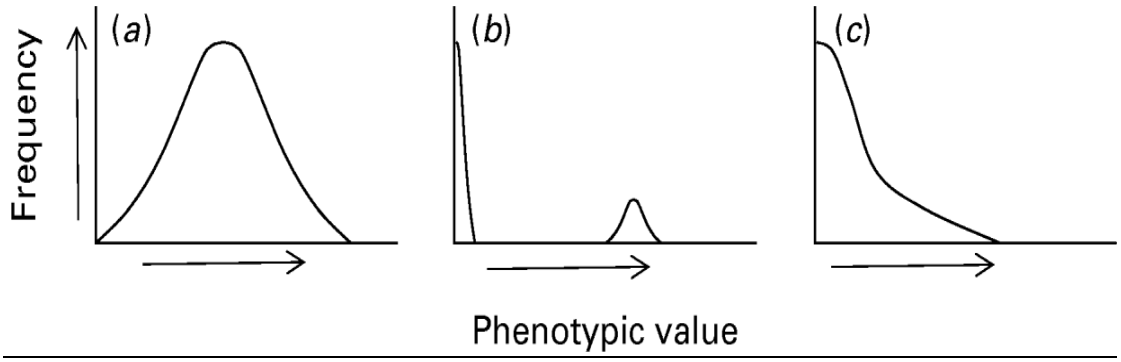
The following caveats should be considered when interpreting the findings of these studies. Firstly, the data reported in these studies may reflect measurement error. In this regard, the assessment instruments that were employed to assess psychotic symptoms may only assess sub-threshold symptoms that are not connected to the clinical characteristics of a true latent category (Alldarcye *et al., 2007*). Secondly, the possibility that schizophrenia exists as a categorical latent structure cannot be disregarded until appropriate statistical analysis, for example, finite fixture modeling, has been applied to population based studies (Alldarcye *et al., 2007*). Thirdly, it is possible that the presence of positive symptoms, namely delusions and hallucinations, that are used as indicators of psychosis/latent psychosis, are merely symptoms that are not central to the core disease manifestations that are central to psychosis (Goldman-Rakic, 1995). These caveats withstanding, the best conducted research completed to date indicates that the same symptoms observed in psychosis disorders exist in the general population as a continuous variable along a continuum of severity (Alldarcye *et al., 2007*; Rossler *et al*., 2007; van Os, 2009).

Summary: The distribution and association of sub-clinical symptoms of schizophrenia/psychosis in the general population to the clinical symptoms of schizophrenia/psychosis are consistent with the propositions that are predicted by a dimensional theoretical model of the construct.

1.3.5 Dimensional Conceptualisation of Schizophrenia/Psychosis: Implications for Aetiology

The distribution of psychotic symptoms in the general population has important implications for the aetiology of the disorder. In this regard, if psychosis exists as a consequence of a single unconfounded causal factor, for example a single gene, then a bimodal distribution of prevalence would be observed in the general population (van Os, 2009) (see figure 1.1, graph b). Conversely, if psychosis exists as a dimensional construct and is a consequence of five or more aetiological factors acting additively the skew observed in the general population is likely to be a normal distribution, similar to that observed in regard to height or weight (see figure 1.1, graph a) (van Os, 2009). Finally, if the psychosis phenotype exists a dimensional construct whereby there is an interaction between the five or more aetiological factors then a half normal population with a significant proportion of the population exhibiting non-zero scores would be observed (see Figure 1.1, graph c). The research evidence reviewed above indicates that the distribution of psychotic symptoms appears to exist as a continuum of experiences in the general population. This evidence correlates best with the half population distribution projection displayed in graph c) and suggests that psychosis has a multi-factorial interactive aetiology (van Os, 2009). The half population distribution projection of psychotic symptoms in the general population that has been consistently reported in epidemiological studies investigating a psychosis continuum implies a multi-factorial interactive aetiology that involves non-genetic factors (van Os, 2009).

Figure 1.1: Possible Distribution of Psychosis Continuum. Reproduced from van Os *et al.* (2003, p. 181).



Summary: The distribution of symptoms of schizophrenia/psychosis in the general population suggests that schizophrenia/psychosis has a multi-factorial interactive aetiology that involves non-genetic factors.

1.3.6 Dimensional Conceptualisation of Schizophrenia: Implications for Current Study

Research evidence that supports the epidemiological validity of a schizophrenia/psychosis continuum has significant implications for the current study. In this regard, the association observed between sub-clinical and clinical symptoms of schizophrenia/psychosis, in regard to distributional, demographic, aetilogical and predictive validity, imply that there is significant continuity between sub- clinical and clinical symptoms of schizophrenia/psychosis (van Os *et al.*, 2009). Therefore, it follows that research that enhances the scientific understanding of psychological mechanisms in schizotypy may enhance the theoretical understanding regarding the aetiology and maintenance of schizophrenia.

The Human Genome Project indicated that humans have approximately thirty to forty thousand genes, approximately 60,000 less than previously predicted (James, 2005). This finding has reemphasised the importance that non-genetic environmental factors have in conjunction with genetic factors regarding to individual human development and psychopathologies (James, 2005). This finding is consistent with the epidemiological

research reviewed that indicated that a multifactorial interactive aetiology involving both genetic and non-genetic factors is likely to be involved in schizophrenia.

Overall, these findings are consistent with a stress-diathesis model of schizophrenia whereby non-biological or genetic predisposition (diathesis) interact with the environment and life events (stressors) to produce the disorder (Zubin & Spring, 1977). A central premise for cognitive models of psychopathology is that latent negative core beliefs (NCB) relating to self, others and the world contribute to the development and maintenance of psychological disorders (Beck *et al.,* 1979). The primary assumption of the stress-diathesis theory of psychopathology is implicit in this model (Beck *et al.,* 1979). In this regard, an individual is more likely to develop psychological difficulties when a diathesis is aggravated by a stressor (Zubin & Spring, 1977). Within the cognitive therapy model, the diathesis for the development of psychological difficulties are hypothesised to be latent NCB (*diathesis*) that are typically formed during infancy/early childhood experiences and are activated by negative life events (*stress*) in later life (Beck, 1979). The activation of NCB are postulated to influence cognitions, behaviours, physiology and general affective states thereby symbiotically maintaining and perpetuating the psychological difficulty. Furthermore, NCB are hypothesised to influence information processing by selectively attending to evidence that reinforces them and therefore are assumed to be resistant to change. This model has been applied to depression (Teasdale & Barnard, 1995), eating disorders (Fairburn *et al*., 2003) and psychosis (Barrowclough *et al*., 2003) and symptoms of psychosis[8] (Bentall *et al.,* 2001; Freeman, 2007). Specifically, with regard to psychosis, cognitive models have emphasised the impact of early experiences in the development of NCB of self as vulnerable and others as threatening as an important vulnerability and maintaining factor in psychosis (Garety *et al*., 2001; Penn *et al.,* 2004). Recent cognitive models of

[8] Expanding on the central premise of the cognitive model that NCB are an important consideration in relation to psychosis Bentall *et al*. (2001) have integrated research evidence investigating cognitive reasoning, attention, metacognitions and attributions to propose a cognitive theory of delusions. Within this model, it is hypothesised that a self serving bias attributes threatening events to the behavior of others to avoid the activation of latent negative beliefs. Similarly, Freeman (2007) has proposed an alternative cognitive theory of delusions. Within the Freeman model, the formation of a persecutory delusion occurs from the complex interaction of cognitive beliefs, anomalous experiences, and cognitive reasoning biases. However, a discussion of these models is beyond the remit of the current discussion as they are primarily cognitively orientated. For further information on these models please see reviews by Bentall (2001) and Freeman (2007).

psychosis have placed increasing emphasise on the impact of interpersonal factors, such as childhood and adulthood interpersonal traumas, in the development of these NCB. In support of this hypothesisied association, longitudinal research indicates that incidents of trauma are significantly elevated in those who have experienced psychosis (Read *et al.*, 2005).

Further research is required to elucidate the precise means that interpersonal factors may increase vulnerability and maintain psychosis (Read, *et al.*, 2005). In this regard, the precise mechanisms by which NCB influence pathways to mediate pathology is unclear at present (Fowler, 2000). However, as will be detailed below, Attachment Theory provides a framework that may address this limitation of cognitive models of psychological disorder (and psychosis). In this regard, attachment theory provides a conceptual framework to elucidate how NCB of self and others, referred to in attachment Theory as *'Internal Working Model,*[9] may mediate psychological processes such as interpersonal functioning and affect regulation to increase vulnerability and maintain psychological disorders. In support of this view, Berry *et al*. (2007) notes that the IWM in attachment theory *'differ from traditional conceptualizations of schemata, in that they reflect more motivated and affectively charged constructs, representing emotional states, associated with interpersonal relationships as well as beliefs'*(p. 465).

The current study will investigate the interaction between predictor variables attachment, interpersonal functioning and depression in relation to schizotypy. The association between these variables will be examined using the stress-diathesis model. From this perspective, attachment will be considered as a developmental diathesis factor and level of interpersonal functioning and depression as environmental risk factors. The latter two variables will be examined as potential mediating environmental risk factors that act on developmental vulnerability factors (attachment) to increase levels of schizotypy. Therefore, the current study will investigate the association between these developmental diathesis and environment risk factors to establish the predictive association of these variables in regard to schizotypy. The following sections will review evidence that, in the opinion of the Chief Investigator, justifies the inclusion of variable attachment as a

[9] The similarities and differences that exist between NCB and '*Internal Working Models'* (IWM) in attachment theory will be detailed 1.4.1 and 1.4.2.

developmental diathesis factor and interpersonal functioning and depression as environmental risk factors for schizotypy.

Summary: The current study will use the stress-diathesis model to investigate the association between attachment (development diathesis factor) and interpersonal functioning and depression (environmental risk factors) as predictors of schizotypy.

1.4.1 Attachment Theory

Bowlby and Ainsworth worked collaboratively on attachment theory (Ainsworth & Bowlby, 1991). The central premises of the theory were postulated by Bowlby (1969; 1973; 1980) and were informed by theoretical concepts and research evidence derived from ethology, evolutionary theory, cybernetics, information processing, developmental psychology and psychoanalysis (Bretherton, 1992). The utility of Bowlby's initial formulation of attachment theory was apparent to Ainsworth from research she had completed investigating infant-mother attachment in Uganda. Ainsworth made significant contributions to the development of the conceptual constructs of the theory and also completed vital research to evaluate the theory. The subsequent advancement and refinement of the theory was the outcome of close intellectual alliance between both parties over the subsequent years (Bretherton, 1992).

Bowlby's formulations of attachment theory were based on concepts derived from ethology. In this regard, Bowlby assumed that all organisms, regardless of phylogenetic scale, are born with homeostatic systems that regulate instinctive behaviours. In complex organisms, these systems were organised into complex plan hierarchies and had evolved to produce repertoires of goal directed behaviour, both time limited and time extended, with the primary function of maximising the likelihood of survival and procreation (Bowlby, 1969).

Bowlby applied the central concepts of ethological theory of behaviour and motivation regulation and proposed that the infant was born with an attachment regulatory system (Bowlby, 1969). This system was hypothesised to be innate and to have evolved to regulate the infant's proximity to caregivers with the purpose of protecting the infant from danger. The motivation of the infant to seek proximity produced attachment behaviours defined as *"any form of behaviour that results in a person attaining or retaining proximity to some other differentiated and preferred individual, who is usually conceived as stronger and/or wiser"* (Bowlby, 1979, p. 129).

Bowlby (1973) had postulated that the absence of an attachment figure and/or experiences of unknown or danger caused the child to experience separation anxiety

which resulted in the activation of attachment behaviours. The purpose of these attachment behaviours was to secure proximity and affection from an attachment figure to alleviate the separation anxiety. Initially the repertoires of attachment behaviours of the infant to promote proximity with a caregiver are limited to behaviours such as crying or smiling. Over time the inventories of behaviours become more extensive. For example, once a child can crawl s/he obtains another means to get the attention of a caregiver in situations where crying has not promoted the desired proximity. Bowlby hypothesised that the instinct to engage in attachment behaviours was a principal motivating factor in child-parent interactions and was independent but of equal importance to the other primary instincts such as seeking food and sexual behaviour (Bowlby, 1980).

As an infant, attachment behaviours are initially directed indiscriminately to all caregivers. However, with time these behaviours become progressively more focused on those individuals who are sensitive to the child's needs resulting in the formation of an attachment (Bowlby, 1960). Ainsworth postulated that once an attachment has been formed the attachment figure operates as a secure base from which exploration of the world could be facilitated (Ainsworth, 1967). Bowlby incorporated the concept of the secure base into the formulations of attachment theory (1973, 1980) hypothesising that the stress reduction and safety promotion that could be provided by a secure base allowed the infant/child to explore the world in a safe and manageable way. The response of an attachment figure to attachment behaviour/separation anxiety that occurred during episodes of exploration from the secure base was considered to be crucial in determining quality of attachment[10].

Bowlby (1969) assumed that an important component of complex hierarchies in organisms was the ability to create an Internal Working Model (IWM) of the environment. Within attachment theory, IWMs were conceptualised as internalised mental representations of the infants' attachment with their caregiver. These IWMs acted as mental prototypes for views of self, others and expectations of care from others in future relationships (Bowlby, 1969, 1973, 1980). The development of the IWMs was assumed to be related to the quality of attachment the individual received from key caregivers as an infant/child. In this regard, an IWM that viewed the self as worthy of

[10] Attachment theory does not assume that situational and/or temperamental factors do not affect the developments of attachments (Bretherton, 1992).

love and others as capable of providing nurturance was assumed to be developed in circumstances where the infant's need for autonomy, proximity and distress alleviation were met by sensitive care. Conversely, where these needs were met by insensitive care an IWM that views the self as unloveable and others as uncaring was hypothesised to develop (Bowlby, 1973). Finally, the attachment style that the infant/child developed was assumed to be determined by the unconscious representations of self and others that was stored in the IWM.

Attachment styles are assumed to maintain and perpetuate the IWM that has been developed from experiences of early attachment by focusing attention, interpreting interpersonal interactions and by initiating behaviours that elicit responses that are consistent with underlying attachment representation in the IWM (Pietromonaco & Barrett, 2000). As a consequence, attachment styles are hypothesised to be resistant to change with alterations to the attachment style only occurring in situations where there is significant and consistent incongruence between interpersonal experiences and attachment IWM[11] (Diamond & Fagundes, 2008). Consequently, IWM developed in early infancy/childhood are hypothesised to influence interpersonal functioning across the lifespan via the attachment style. As will be discussed, this has important implications for affect regulation and vulnerability to psychopathology.

Summary: Experiences of attachment are stored in the infant/child's IWM which is hypothesised to influence interpersonal functioning across the lifespan via attachment styles.

1.4.2 Attachment across the Lifespan

Ainsworth & Wall (1978) made laboratory based observations of twelve month old infants to the separation of their caregiver using a procedure known as the "*The Strange*

[11] In this regard, there are clear similarities between the constructs of self and other schemata proposed in cognitive models by Garety *et al*., (2001), Barrowclough *et al*., (2003), Freeman (2007), Bentall *et al*., (2001) and IWM in attachment theory (Platts *et al*. 2002). For example, both IWM and schemas are hypothesisied to be maintained by similar processes, such as focusing attention, influencing interpretation and eliciting responses that are consistent with stored conceptualisation of relationships. In support of this view, Wearden *et al*., (2008) reported that negative self evaluative views of self were associated with anxious attachment.

Situation". Individual attachment behaviors were hypothesised to indicate the unconscious representations stored in IWM regarding the infant's expectations relating to the stress of separation and the subsequent reunion. Based on these and subsequent observations four attachment styles/patterns were identified namely secure, avoidant, ambivalent (Ainsworth & Wall, 1978) and disorganised (Main & Solomon, 1990). Infants who were classified as displaying a secure attachment were mildly distressed at the time of separation but allowed themselves to be reconciled with their caregiver on return. Infants categorised as exhibiting avoidant attachments showed minimal signs of distress at time of separation but were rejective of affection at reunion. Infants categorised as indicating ambivalent attachment displayed high distress levels at separation and an inability to be placated at reunion. Finally, infants who were classified as disorganised attachments demonstrated behaviours that were typically a combination of avoidance and/or resistance to the responses of caregivers.

Attachment styles and their corresponding behaviors remain relatively stable into mid childhood (Crittenden & Ainsworth, 1989). The attachments formed between the individual and their primary caregiver does not appear to be relinquished during adolescence even in those individuals that form significant romantic relationships (Markiewicz *et al.*, 2006). However, attachment behaviours do appear to become progressively less focused on primary care givers and more centered on peers during adolescence (Diamond & Fagundes, 2008) and romantic partners in adulthood (Hazan & Shaver, 1987). However, since the current research is investigating the association between schizotypy and adult attachments it will not be possible to provide a detailed discussion regarding the research reviewing the attachments styles in adolescence (Diamond & Fagundes, 2008).

Two distinct research paradigms have been developed to investigate attachment styles in adulthood, namely narrative and self-report methods. The premises of both research paradigms are consistent with the central tenets of attachment theory. In this regard, both approaches assume that the fundamental function and dynamics of the attachment systems in adulthood are equivalent to the infant–primary caregiver attachment in childhood, namely to increase proximity maintenance to a peer or partner to facilitate stress reduction and security seeking (Diamond & Fagundes, 2008). However, although the primary aim of the attachment style in infancy and adulthood is assumed to be

functionally equivalent this does not mean that the dynamics are similar. For example, adult attachments are hypothesised to be more reciprocal than those observed in infant/child-caregiver relationships and adolescent- caregiver and/or peer attachments with adults interplaying both '*attachment figure*' and '*attached individual*'. For example, an adult is likely to be an '*attachment figure*' during periods when their partner is experiencing stress and an '*attached individual*' when as an individual they are experiencing stress (Diamond & Aspinwall, 2003).

There are also significant differences between the paradigms in regard to both the assessment methods employed and the content and structure of the model to conceptualise adult attachment styles (Berry *et al*., 2007). Both approaches are assumed to have distinct advantages in the assessment of adult attachment styles (Ravitz, *et al*., 2010).

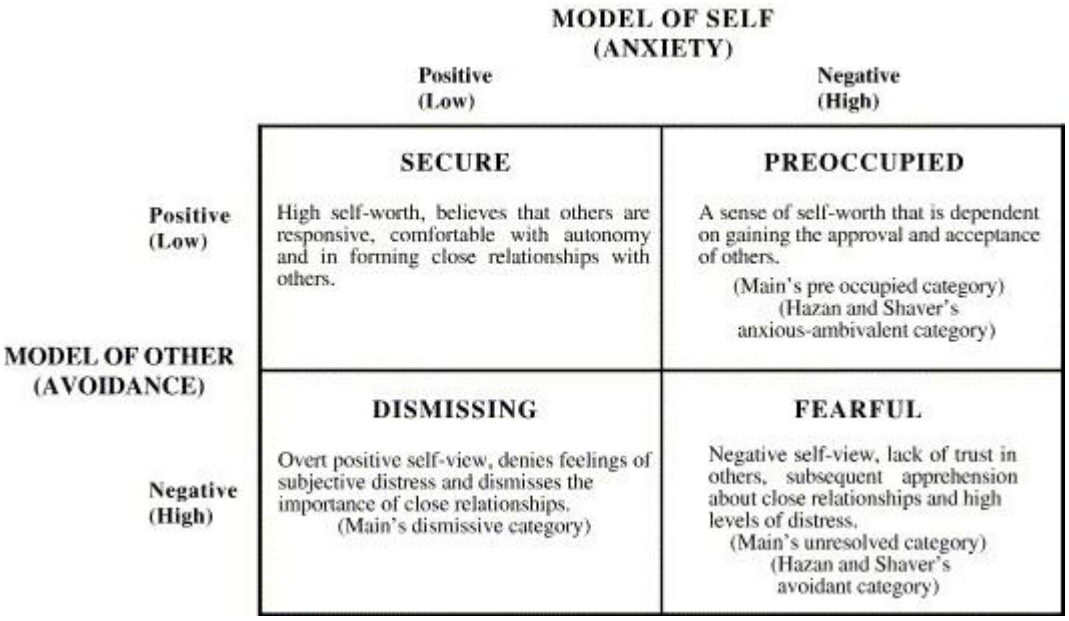
The Adult Attachment Interview (AAI) (Main *et al*., 1985) is the most frequently used and best validated narrative method for investigating adult attachment styles (Ravitz, *et al*., 2010). During the interview the interviewee provides a discourse of their early childhood experiences. Transcribed descriptions of the interview are used to measure the interviewee's '*State of mind' and the* '*parental behaviour'* of each parent. On the basis of the scores obtained, the interviewee is classified as either '*Secure-Autonomous', 'Dismissing', 'Preoccupied' 'Cannot Classify'* or *'Unresolved'*. A meta-analysis investigating the clinical applications of AAI indicated good stability and predictive validity for this assessment method (van Ijzendoorn *et al.*, 2008). However, training is required to administer and score the AAI. Likewise, conducting an AAI interview is time consuming and labor intensive as the scores obtained during interviews must be cross validated by another professional who has received the appropriate AAI training.

The second paradigm used to investigate adult attachment was developed from research completed by Hazan and Shaver (1987). Information provided in self-report questionnaires in regard to current close relationships are assumed to provide a representative trait indicator of overall attachment styles. Self-report questionnaires have the advantage of being convenient to administer, have good validity and a significant amount of time is not required to complete (Ravitz, *et al*., 2010).

Hazan and Shaver (1987) have translated the attachment styles identified by Ainsworth's *et al*. (1978) in the '*Strange Situation'*, namely secure, avoidant, and anxious-ambivalent, into three corresponding adult attachment styles. Further to this a significant number of self-report questionnaires have been developed to measure and conceptualise adult attachment style. These questionnaires are typically subdivided into those derived from categorical and dimensional conceptualisations of attachment (Ravitz *et al*., 2010). Factor analysis has demonstrated a two dimension solution for the various self-report measures of adult attachment (Brennan *et al.*, 1998). This two factor solution can be conceptualisied in either '*affective-behavioural terms (anxiety versus avoidance) or cognitive terms (model of self versus model of others')* (Berry *et al*., 2007, p. 461).

Bartholomew and Horowitz (1991) proposed a model of adult attachment that theorized four distinct adult attachment styles, namely *'Secure, 'Preoccupied', 'Dismissing'* and *'Fearful*' as displayed in figure 1.2. Within this model it was hypothesised that the *"dismissing attachment"* reported by (Main *et al*., 1985) and the "*Attachment Avoidant"* indicated by research completed by Hazan & Shaver (1987) were two distinct forms of anxiety. The Bartholomew model is measured using the '*Relationship Questionnaire'* (Bartholomew & Horowitz, 1991). Guidance in regard to the use of the RQ to assess attachment styles states that this questionnaire '*was designed to obtain continuous ratings of each of the four attachment patterns, and this is the ideal use of the measure'* (Bartholomew, 2011, p1*).* However, this questionnaire can also be used to classify attachment styles as either '*attachment anxiety*' or '*Attachment Avoidance*'. Within this model '*Attachment Anxiety*' is associated with a negative self image and was hypothesised to be motivated by a need for approval, a fear of refutation and poor affect regulation (Shaver & Mikulincer 2002). *'Attachment Avoidance'* was hypothesised to be characterised by a negative image of others, defensive self sufficiency, social avoidance and an antagonistic interpersonal style (Mikulincer *et al*., 2003). As these styles are hypothesised to exist orthogonally participants can have elevated scores on both dimensions (Berry, *et al*., 2007). The application of both dimensional and categorical constructs increases the interpretational power of the model since each of the attachment categories can also be measured dimensionally (Griffin & Bartholomew, 1994).

Figure 1.2: Model of Adult Attachment (Bartholomew and Horowitz, 1991). Reproduced from, (Berry *et al.,* 2007, p. 461).



As noted, attachments are hypothesised to generate interpersonal behaviours that reinforce and perpetuate IWM, thereby maintaining attachment/attachment styles. However, there is inconsistent evidence regarding the continuity of attachments from childhood, to adolescence to adulthood (Diamond & Fagundes, 2008; Goodwin, 2003; Wearden 2008). Furthermore, the different research methodologies that are used to assess attachment styles at different periods have complicated attempts to assess the continuity of attachments across different time periods (Diamond & Fagundes, 2008). However, despite the inconsistency in findings the significant majority of longitudinal research appears to indicate that attachment styles formed in infancy/childhood continue into adolescence and adulthood (Diamond & Fagundes, 2008). In support of this view, it is noted by Berry *et al*. (2007) '*Retrospective and longitudinal studies within both narrative and self-report research paradigms have provided evidence of relative stability but not complete consistency in attachment styles, over time scales ranging from several months to 30 years'* (p. 461).

Therefore, it would appear that attachments styles are resistant to change but revisions to IWM can occur. This conclusion is entirely consistent with attachment theory which hypothesises that IWM can be modified by experiences that are inconsistent with the

mental representation of self, others and the world. In support, longitudinal research has indicated that the development or termination of significant relationships and interpersonal traumas (Hamilton, 2000) can facilitate change in attachment styles.

It would appear that early relationships are likely to have a significant influence on attachment but that experiences during adolescence and adulthood that are significantly inconsistent to the mental representations in the IWM can modify attachment styles (Fraley, 2002). Finally, it should be noted that attachment theory is a useful theory to understand adult interpersonal functioning regardless of the extent to which there is continuity between attachments formed in infancy/childhood, adolescence and those observed in adulthood (Goodwin, 2003).

Summary: Two research paradigms, namely narrative and self-report, have been used to investigate attachments in adulthood. The majority of research indicates that there is significant stability in attachments from infancy/childhood to adulthood although alterations to attachment styles can occur.

1.5.1 Attachment, Emotional/Affect Regulation and Psychopathology

Emotional regulation (or emotional deregulation) has been defined by Aldao *et al.* (2010) "*conceptualized as processes through which individuals modulate their emotions consciously and nonconsciously to appropriately respond to environmental demand"* (p. 218). In the literature the term '*emotional (de) regulation*' is used interchangeably with '*affect regulation'* yet minor differences exist between them that warrant distinction. In this regard, the term '*affect regulation*' relates not only to the processes of modulation of distinct environmentally elicited emotions but also incorporates broader continual affective mood states (Larsen, 2000). As noted by Diamond & Fagundes (2008) '*Because powerful emotions have the potential to disorganize and/or disrupt multiple psychological processes, modulation of their experience and expression (through both intrapsychic and interpersonal experiences) has been considered essential for basic state regulation, behavioural exploration, cognitive processing, and social competence'*(p. 91).

As a consequence, the mastery of emotional/affect regulation strategies is considered to be an essential task of the child and adolescent (Masten, 2001).

Functional emotional regulation is associated with positive outcomes in psychological well being, health, occupational performance and relationships (Bracket, 2006). Conversely, there is increasing recognition regarding the role that emotional regulation has in the development and maintenance of psychological disorders (Tasca *et al.,* 2009). In support, research has consistently demonstrated that poor emotional regulation is a cardinal feature of Generalised Anxiety Disorder (Mennin *et al.,* 2007), Major Depressive Disorder (Nolen-Hoeksem *et al.,* 2008), Eating Disorder (Tasca *et al*., 2009), Borderline Personality Disorder (Linehan, 1993) and substance abuse related disorders (Fox *et al.,* 2007).

Aldao *et al.* (2010) completed a meta-analysis that combined 241 effect sizes from 114 studies that investigated the association between emotional regulation, anxiety, depression, eating pathology and substance abuse related disorders. The results indicated that each of the psychopathologies was positively associated with maladaptive regulatory strategies, namely rumination, avoidance and suppression. Conversely, adaptive regulation strategies, namely acceptance, appraisal and problem solving were negatively associated with psychopathology (Aldao *et al*., 2010). The results of this meta-analysis are consistent with previous research that has consistently identified an association between dysfunctional emotional regulation and psychopathology. In recognition of the role that emotional regulation has in psychological disorders, emotion regulation training has been incorporated as a core component in traditional Cognitive Behavioral interventions (Beck, 1979), Dialectical Behavioral Therapy (Linehan, 1993) and Acceptance and Commitment Therapy (Hayes *et al.,* 2006).

Attachment theory is one of the most preeminent theories for understanding affect/emotional regulation and interpersonal functioning (Mikulincer & Shaver, 2007). As noted previously, attachment theory postulates that early attachment experiences are internalised in the IWM and serve as mental prototypes in regard to the views developed in regard to the self and others in relation to future expectations of care from attachment figures. However, from the perspective of attachment theory early attachment experiences are also an important factor in determining the infant/child's ability to

regulate their emotional states (Schore, 2001). In this regard, the responses of the attachment figure to the infant/child needs, particularly in relation to separation anxiety that occurs during episodes of exploration from the secure base (Milkulincer and Sheffi, 2000), are assumed to relate to the self-regulatory emotional strategies that are subsequently developed by the infant/child.

Attachment theory hypothesised that the attachment styles that were employed by the infant/child to manage early experiences of separation anxiety are encoded in the IWM of the infant/child and are employed to manage emotionally eliciting events across the lifespan (Diamond & Fagundes, 2008). From this perspective, infants/children who were not provided with appropriate external emotional regulation from primary caregivers are likely to develop insecure attachment styles characterised by pervasive developmental deficits in regard to their own abilities to self-regulate affect (Glaser, 2000). Furthermore, it is postulated that attachment styles, mediated by the IWM, are an important determinant regarding how the individual regulates distress (Diamond & Fagundes, 2008) across the lifespan. Applying the aforementioned model of adult attachment, secure attachment styles are associated with positive and constructive use of affect regulation strategies. For example, the constructive and appropriate use of social supports. Conversely, individuals with an attachment style of '*Attachment Anxiety'* and '*Attachment Avoidance*' have been indicated to be associated with negative affect regulation (Mikulincer & Shaver, 2003). In this regard, both negative styles of attachment are characterised by efforts of self-reliance and corresponding failure to seek proximity to an attachment figure thereby, minimising the emotional regulating benefits that may be obtained from others during episodes of stress. It has been hypothesised that those individuals who cannot employ appropriate affect regulation strategies to manage their emotional responses to daily stressors, are more likely to experience more pronounced periods of distress and as a consequence be at a higher risk of developing mental health issues (Mennin *et al.,* 2007).

Consequently, insecure attachment styles and associated strategies for affect regulation are considered as an important risk factor for psychological disorders. In support, research evidence indicates a robust association between insecure attachment styles and many bio-psychosocial problems (Ravitz, *et al*, 2010) including anxiety disorders (Manassis *et al*. 1994), depression (Horowitz, *et al*., 1993), psychosis (Dozier *et al*, 2001)

and personality disorders (Meyer *et al*., 2001). Of particular relevance to the current study is the association between insecure attachment and affect regulation in depression, psychosis and schizotypy.

Summary: Attachment styles, mediated by the IWM, are an important determinant regarding how the individual regulates distress. Dysfunctional attachment styles and their corresponding attachment styles have been identified as a risk factor for psychopathology.

1.5.2 Depression and Affect Regulation

The association between dysfunctional affect regulation and depression is well established (Mennin *et al.*, 2007; Aldao *et al*., 2010; Tasca *et al*., 2009). In support, the aforementioned meta-analysis completed by Aldao, *et al*. (2010), that investigated the association between emotional regulation to anxiety, depression, eating pathology and substance abuse related disorders, reported a robust association between depression and affect regulation. In this regard, random-effect model correlations indicated that dysfunctional emotional regulation styles, namely avoidance, rumination and suppression were positively associated with depression while problem solving and reappraisal were negatively associated. On the basis that the association has been well established recent research has been orientated towards investigating the mechanisms through which dysfunctional affect regulation influences depression. At the time of the thesis proposal, the Chief Investigator could identify three studies, namely Wei *et al*. (2005a), Wei *et al*. (2005b) and Tasca *et al*. (2009) that investigated this subject matter. These studies will now be briefly reviewed.

Wei *et al.* (2005a) completed a longitudinal study that investigated the mediating role of social self-efficacy (SSE) and self-disclosure (SD) in relation to attachment and feelings of loneliness and subsequent depression. Participants were 308 university students consisting of 183 females, 125 males with a mean sample age of 18 years. The overall result of this study indicated that there was a systematic association between attachment styles, SSE, SD, loneliness and depression. However, analysis using structural equation modeling indicated that there were divergent and separate interpersonal deficiencies in the social styles of those with '*Attachment Anxiety*' and '*Attachment Avoidance*' that

mediated the relationship between SSE, SD, loneliness and depression. In this regard, the relationship between '*Attachment Anxiety'*, loneliness and subsequent depression was mediated by social self-efficacy. Conversely, the analysis indicated that the relationship between '*Attachment Avoidance'*, loneliness and subsequent depression was mediated by self-disclosure. It would appear that students with elevated levels of '*Attachment Anxiety*' had reduced self-efficacy and that this increased feelings of loneliness and subsequent depression. Likewise, it would seem that students with high levels of '*Attachment Avoidance'* were less likely to self-disclose and that this resulted in increased vulnerability to experience feelings of loneliness and subsequent depression. The findings from this study indicates that attachment styles are an important mediating factor in regard to vulnerability to depression.

Wei *et al*. (2005b) investigated the association between affect regulation, attachment, negative mood (anxiety and depression) and interpersonal problems. Participants were 229 undergraduate psychology students consisting of 148 females, 70 males (11 participants did not indicate their gender) with a mean age of 19 years. The overall result of the study indicated that '*Attachment Avoidance*' and '*Attachment Anxiety*' were positively associated with negative mood difficulties. However, results of the structural equation modelling completed indicated that distinct affect regulation strategies were associated with both '*Attachment Anxiety*' and '*Attachment Avoidance'* styles. In this regard, '*Attachment Anxiety*' contributed to negative mood and interpersonal problems but was mediated by '*Emotional Reactivity*', the latter characterised by an overreaction to negative feelings. '*Attachment Avoidance'* was also indicated to contribute to negative mood and interpersonal problems but was mediated by '*Emotional Cut-Off*' which was typified as an emotional regulation strategy, whereby negative feelings were minimised. The results of this study are consistent with Wei *et al*. (2005) which indicated that attachment styles mediate the association between interpersonal problems and depression.

Tasca *et al*. (2009) investigated the relationship between affect regulation strategies in regard to attachment insecurity and symptoms of depression and eating disorder. Affect regulation strategies were classified as either '*Hyperactive*' or '*Deactivating*' which corresponded to '*Emotional Reactivity*' and '*Emotional Cut-Off*' respectively, as defined in the Wei *et al*., (2005) study. Participants were 310 females receiving treatment for eating disorders who were all aged under seventeen years old. The overall results of the

study indicated that there was a systematic relationship between attachment, affect regulation strategies, depressive and eating disorder symptoms. Of relevance to the current discussion regarding the association between attachment, affect regulation strategies and depression, it was reported that '*Hyperactive'* affect regulation strategies mediated the relationship between '*Attachment Anxiety*', eating disorder symptoms and depressive symptoms. Furthermore, it was reported that '*Deactivating'* mediated the relationship between '*Attachment Avoidance*' and depressive symptoms (but not eating disorder symptoms). Tasca *et al.,* (2009) concluded that the results of their study '*are consistent with a growing literature indicating that attachment insecurity acts upon clinically relevant indicators of distress, such as depression and interpersonal problems, through mediating psychological processes'* (p. 665).

Summary: Research evidence indicates that poor emotional/affect regulation has an important mediating role in precipitating and maintaining depressive disorders.

1.5.3 Attachment, Affect Regulation and Psychosis

Deficits in interpersonal functioning are considered to be a cardinal feature of psychosis (Penn *et al.,* 2004). Despite this association there has been limited research investigating the specific relationship between attachment, affect regulation styles and psychosis (Berry *et al*., 2007). However, recently there has been increasing research interest in the role that insecure attachment styles and their corresponding affect regulation strategies may have in regard to both the aetiology and maintenance of psychosis (Berry *et al.,* 2007).

In regard to aetiology, as noted previously, significant research evidence exists indicating a robust association between interpersonal traumas in childhood/adulthood to the formation of negative beliefs that increase vulnerability to psychosis (Read *et al.,* 2005). In recognition of this, there have been increased efforts to incorporate interpersonal and affective factors into psychosocial models to augment the exploratory capacity of these theories in regard to the mechanisms that increase vulnerability to psychosis (Garety *et al.,* 2001). As noted, attachment theory provides a framework to complement cognitive models to explain how unhelpful core beliefs/schemas may result in an increased vulnerability in developing schizophrenia. For example, an individual with an insecure

avoidant attachment styles is likely to employ dysfunctional affect regulation strategies that are based on self-sufficiency and therefore may be less likely to seek assistance during stressful episodes. This seems especially pertinent as psychotic episodes are associated with high levels of distress (Bendall *et al*., 2006).

In regard to maintenance of psychosis it has been recognised that the overall level of interpersonal functioning is associated with relapse and recovery in individuals with psychosis (Platts *et al*., 2002). In support of this association research evidence has indicated a robust association between '*Expressed Emotion*' (EE) and relapse of psychosis. EE relates to a set of emotional responses that are directed towards the patient. Specific types of EE, namely '*emotional enmeshment' 'hostility'* and '*criticism'* are strongly associated with relapse (Wearden *et al.,* 2000). The specific mechanisms of action for EE are unclear at present but again emphasises the role of interpersonal factors/functioning in the maintenance of psychosis. Furthermore, attachment theory provides a conceptual framework to generate testable hypotheses in regard to how individual IWM and corresponding affect regulation result in maladaptive coping strategies and elicit maladaptive responses from others. For example, a patient who has attachment avoidance styles who may consider themselves as reliant and who defensively devalues their need for relationships may evoke criticism from others for being too independent.

Berry *et al*. (2007) completed a review of the role of adult attachment styles in psychosis to investigate the validity of the association of attachment and psychosis. To facilitate this, all papers on the PsycInfo database from 1985 to 2004 that used samples with participants with psychosis or other severe and mental health difficulties and were identified using the words '*attachment*' were used in the review. Further to this, all articles cited in these studies that were of relevance to the review in addition to studies that were identified using search phrases '*parental bonding'* and '*schizophrenia'* were also included. Despite limited research completed to investigating this association the most consistent finding indicated that there were elevated levels of insecure attachment in schizophrenics (Berry *et al.,* 2007).

Summary: The limited research that has investigated the association between attachment and psychosis has identified attachment as an important factor in regard to the aetiology, maintenance and relapse of psychosis.

1.6.1 Attachment and Schizotypy

There has been limited research completed that has investigated the association between attachment and psychosis, despite evidence indicating that interpersonal deficits/difficulties are a cardinal feature of the latter (Berry *et al*., 2007). Furthermore, there has been a dearth of research investigating the association between schizotypy and attachment. In support of this assertion, Tiliopoulous & Goodall (2009, p. 300) noted that "*empirical evidence that directly and exclusively assesses the nature of the association between attachment and schizotypy is virtually non-existent"*. At the time of the thesis proposal, the Chief Investigator could only identify the following three studies in the previous fifteen years that had investigated this association: Berry *et al*. (2006); Meins *et al*. (2008) and Tiliopoulos & Goodall (2009). This research will be reviewed chronologically beginning with the research completed by Berry *et al*. (2006).

The primary aim of the Berry *et al*. (2006) study was to investigate the validity of a new measure of attachment called the *Psychosis Attachment Measure* (PAM). The secondary aim was to investigate the association between attachment and sub-clinical psychotic phenomena. Participants were 323 (72% were females) students who completed self-report questionnaires that assessed: attachment (Psychosis Attachment Measure – PAM), (Berry *et al*., 2006) and the Relationship Questionnaire - RQ: (Bartholomew & Horowitz, 1991)), interpersonal problems (Inventory of Interpersonal Problems-32 - IIP-32: (Barkham *et al.,* 1996)), self-esteem (Self-Concept Questionnaire – SCQ: (Robson, 1989)), early interpersonal experiences (Parental Bonding Instrument – PBI: (Parker *et al*., 1979)), experiences of trauma (Trauma History Questionnaire – THQ: (Green 1996)), positive schizotypy (20 item paranoia scale – PS: Fenigstein & Vanable, (1992) and the Launay-Slade Hallucination Scale – LSHS: (Launay & Slade, 1981)), negative schizotypy (40 item revised Social Anhedonia Scale – SAS: (Eckblad *et al*., 1982)) and affect (Positive and Negative Affect Schedule - PANAS; (Watson *et al*., 1988)). Factor analysis was used to investigate the psychometric properties of the PAM. Correlational

analysis was employed to investigate the association between attachment, self-esteem, interpersonal functioning and non-clinical psychotic phenomena.

The results of the factor analysis indicated good psychometric properties for the PAM. However, since this finding is of minor relevance to the current study it will not be discussed further. The core findings of this study in regard to the association between attachment, interpersonal problems and schizotypy were as follows. Firstly, in regard to the association between attachment and interpersonal functioning, both *Attachment Anxiety* and *Attachment Avoidance* were positively correlated with overall level of interpersonal functioning[12]. The correlation observed between *Attachment Anxiety* and interpersonal functioning was stronger than the correlation observed between *Attachment Avoidance* and interpersonal functioning. This study did not investigate/report the associations between attachment variables and the sub-scales of the IIP-32. Secondly, the following associations were reported between schizotypy and attachment. Both *Attachment Anxiety* and *Attachment Avoidance* were positively associated with '*Paranoia', 'Social Anhedonia'* and *'Hallucination Proneness'*. These associations remained significant, with the exception of the association between '*Attachment Avoidance*' and *'Hallucination Proneness'*, when the effects of negative affect were controlled.

The Chief Investigator of the current study identified four potential methodological weaknesses in the Berry *et al*. (2006) study. Firstly, the data set that was used to investigate the hypotheses was significantly skewed and attempts to transform it were unsuccessful. The authors of the Berry *et al.,* (2006) study did not clarify what impact this may have had on the results reported in the study. Secondly, the measures used to assess schizotypy, namely Paranoia Scale (PS; Fenigstein & Vanable, 1992), the Launay-Slade Hallucination Scale (LSHS; Launay & Slade, 1981) and the revised Social Anhedonia Scale (SAS; Eckblad *et al*., 1982) are unlikely to have comprehensively assessed all domain factors of this construct. Thirdly, the hypotheses in this study did not provide sufficient detail regarding the predicted associations between the variables that were included in the study. Fourthly, the use of multiple correlations to investigate the hypotheses is likely to have increased the likelihood of a type one error.

[12] High score on IIP-32 indicate poor levels of interpersonal functioning.

Meins *et al*. (2008) investigated the association between peer attachment dimensions and parental bonding in regard to schizotypic traits in a non-clinical student sample. Participants were 154 undergraduate students (64% were female) who completed self-report measures that assessed peer attachment (Relationship Questionnaire - RQ: Bartholomew & Horowitz, 1991), schizotypal traits (Schizotypal Personality Questionnaire - SPQ: Raine, 1991) [13] and perceived parenting (Parental Bonding Instrument - PBI: Parker *et al.*, 1979). The primary hypothesis in this study was that '*Attachment Anxiety*' would be related to negative symptoms of schizotypy and '*Paranoia*'. This study also investigated the association between '*Attachment Avoidance*' and '*Attachment Anxiety*' to sub-scales '*Magical Thinking*' and to '*Disorganised Speech*' and '*Odd Behaviors'*, but no predictions were made regarding the direction of association that would be observed between these variables. This study also made specific hypotheses concerning the association between schizotypy and parental bonding but since this is not of relevance to the current study no further discussion regarding these hypotheses and the corresponding results will be made here.

Primary hierarchical linear regressions were computed to investigate the predictive association between '*Attachment Anxiety*', '*Attachment Avoidance*' and schizotypy[14]. The assumption of normality of residuals was violated in regard to sub-scales *'Magical Thinking', 'Unusual Perceptual Experiences', 'No Close Friends*' and '*Odd Behaviour*' for these regressions[15]. The results indicated that '*Attachment Anxiety*' and '*Attachment Avoidance*' predicted SPQ total score and each individual negative schizotypal sub-scale ('*Social Anxiety', 'No Friends' and 'Constricted Affect'*). '*Paranoia*' was predicted by '*Attachment Anxiety*' but not by '*Attachment Avoidance'*.

[13] First order dimensions relates to the three domain factors of the SPQ, namely '*Cognitive-Perceptual', 'Interpersonal' and 'Disorganised*'. Second order factors related to the nine sub-scales of the SPQ, namely *'Ideas of Reference', 'Magical Thinking', 'Unusual Perceptual Experiences', 'Paranoia', 'Social Anxiety', 'No Close Friends', 'Constricted Affect', 'Eccentric Behaviour'* and '*Odd Speech*'. First order dimensions relates to the three domain factors of the SPQ, namely '*Cognitive-Perceptual',' Interpersonal' and 'Disorganised*'.

[14] The mean centered interaction for these variables was used for the linear regressions computed in this study.

[15] This violation could potentially have affected the outcome of the results, but this is unlikely since linear regression analyses are considered to be robust when this principle is breached.

Secondary hierarchical linear regressions were computed to establish whether the observed associations between attachment and schizotypy were independent of the effects of parental bonding. For this regression, sub-scales '*Ideas of Reference', 'Magical Thinking', 'Unusual Perceptional Experiences', 'No Close Friends' and 'Odd Behaviour'* and domain factor '*Disorganised*' violated the normality of residuals. The results indicated that when controlling for the effects of PBI, '*Attachment Anxiety*' continued to predict SPQ total but '*Attachment-Avoidance'* did not. Controlling for the effects of PBI did alter the associations previously observed between '*Attachment-Avoidance'*, '*Attachment-Anxiety*' to domain factor '*Interpersonal*' and sub-scale '*Suspiciousness*'. However, '*Attachment Anxiety'* no longer continued to predict sub-scales '*No Close Friends*' and '*Constricted Affect*' when the effects of PBI were controlled. Lastly, neither '*Attachment Avoidance*' nor '*Attachment Anxiety*' continued to predict sub-scale '*No Close Friends'*.

The positive association between '*Attachment Avoidance*' and '*Paranoia*' reported by Berry *et al*., (2006) was not replicated in the Meins *et al.,* (2008) study. Meins *et al*., (2008) hypothesised that the original finding reported in the Berry *et al*., (2006) study was the consequence of a type one error that had occurred as a result of the serial use of correlational analysis. Furthermore, the association reported by Berry *et al*., (2006) between '*Attachment Anxiety'*, '*Attachment Avoidance'* and '*Hallucinations-Proneness'* were not duplicated in the Meins *et al*., (2008) study. To account for the latter inconsistency, Meins *et al*., (2008) speculate that this finding was detected in the Berry *et al*. (2006) study because the former used a more sensitive measure of this positive symptom, namely the Launay-Slade Hallucination Scale.

Overall the results of the Meins *et al.,* (2008) study supported previous findings by Berry *et al*., (2006) that had indicated an association between '*Attachment Avoidance*', '*Attachment Anxiety*' and negative schizotypal symptoms. Furthermore, the association observed in the Berry *et al*., (2006) between '*Attachment Anxiety*' and '*Paranoia*' was replicated. In regard to potential limitations of the Meins *et al.,* (2008) study, the use of a relatively small homogeneous sample consisting entirely of students compromises the external validity of the findings. Likewise, the statistical analysis employed inhibits the conclusion regarding the non-linear association that may have existed between schizotypy and attachment.

Tiliopoulos & Goodall (2009) investigated the relationship between adult attachment and schizotypal personality traits. Participants were 161 non-clinical adults (68% were female) who completed measures that assessed schizotypy (Schizotypal Personality Questionnaire - SPQ: Raine, 1991) and adult attachment (The Experience in Close Relationships self-report measure - ECR: Brennan *et al*., 1998). Bivariate and multivariate canonical correlations were computed to investigate the association between attachment and schizotypy. Multivariate canonical correlations that were computed on first order SPQ indicated the following. Firstly, a positive association was observed between '*Attachment Avoidance'* and the '*Interpersonal*' domain factor of the SPQ. Secondly, a positive association was observed between '*Attachment Anxiety*' to '*Interpersonal*', '*Disorganised*' and the '*Cognitive-Perceptual*' domain factors. Correlations computed using second order schizotypic traits indicated that '*Attachment Avoidance'* was only positively correlated with all second order factors in the '*Interpersonal*' domain factor. '*Attachment-Anxiety*' was positively correlated to all second order factors of schizotypy with the exception of '*Magical Thinking*' and '*No Close Friends*'. The researchers hypothesised that the association observed between '*Attachment Avoidance*' and first and second order schizotypal traits was understood in the context of the interpersonal coping style associated with this attachment style, namely social indifference and diminutive affect. In regard to the relationships observed between attachment anxiety to the positive and negative schizotypal traits, the researchers concluded that further research was required to establish the reason (s) for this association. Overall, the researchers concluded that an attachment anxiety style, mediated through cognitive styles, is likely to be an important predisposing factor within a multifactorial aetiology for schizotypy. This conclusion appears logical, although it should be considered speculative since the correlation analysis employed cannot establish the direction of the relationship observed between schizotypy and attachment.

With regard to potential methodological issues of the study, the researchers state that on account of the limited research that has investigated the association between schizotypy and religious attitudes they were unclear as to how the constitution of the sample used, which consisted almost entirely of Christians, may have affected the results of the study. Furthermore, the statistical analysis employed, namely the correlational analysis, inhibits the conclusions that may be made regarding the causality of the associations that were

observed between schizotypy and attachment in this study. Finally, like the aforementioned studies, Tiliopoulos & Goodall (2009) did not investigate the non-linear associations between attachment and schizotypy.

Summary: The overall results of the studies that have investigated the association between attachment and schizotypy have indicated a negative association between insecure attachment styles and schizotypy.

1.7.1 Scientific Justification for the Current Study

The main finding of the Human Genome Project, allied to the epidemiological research reviewed regarding the distribution of schizotypic traits in the general population (van Os, 2009) implicates a multifactorial aetiology, that involves non-genetic factors, in schizophrenia. As noted, these findings are consistent with a stress-diathesis model of schizophrenia, whereby genetic predisposition (diathesis) interact with environmental factors (stressors) to produce the disorder (Zubin & Spring, 1977). Furthermore, the aetiological validity of the psychosis continuum hypothesis indicates that the aetiological factors associated with symptoms of schizotypy are similar to those in schizophrenia. The corollary of this is that the theoretical understanding of the psychological mechanisms that are involved in schizotypy may further enhance the scientific understanding regarding the aetiology and maintenance of schizophrenia.

An important non-genetic factor within the current stress diathesis models of schizophrenia is attachment (Berry *et al*., 2007). Despite this there has been a dearth of research investigating the association between these constructs (Tiliopoulous *et al*., 2009). The studies that have investigated this association have indicated a moderate association between insecure attachment and schizotypy. The individual methodological weaknesses of these studies have been indicated above. Of note, and of particular pertinence to the current study, only one of these studies included a state measure of interpersonal functioning, and none included a measure of depression or employed non-linear statistical analysis to investigate the association between attachment and schizotypy.

The current study will investigate the systematic association between predictor variables '*attachment style*', '*interpersonal functioning*' and '*depression'* in relation to schizotypy. Schizotypy will be assessed using the Schizotypal Personality Questionnaire (SPQ: Raine, 1991). Depressive symptoms will be assessed using the Beck Depression Inventory II (Beck *et al*., 1996). A trait measure of attachment will be assessed using The Relationship Questionnaire (RQ: Bartholomew & Horowitz, 1991). A state measure of attachment/interpersonal functioning will be assessed using the Inventory of Interpersonal Problems-32 (IIP-32: Barkham *et al.*,, 1996). Further information on these measures is detailed in section 2.3 of this thesis.

The current study will use a clinical sample (see section 2.2.1) to investigate the predictive associations between schizotypy, attachment, interpersonal functioning and depression. Participants in clinical samples are assumed to contain elevated levels of schizotypy (Tiliopoulous & Goodall, 2009), insecure attachment styles and general mood difficulties in comparison to participants from non-clinical samples. Furthermore, as noted, difficulties in these domains are positively associated with elevated levels of affect/emotional regulation problems and associated deficits in regard to overall level of interpersonal functioning. A clinical sample will therefore allow optimal identification of any associations that may exist between the variables that are being investigated in the current study.

The systematic association between variables '*schizotypy', 'attachment', 'interpersonal functioning'* and '*depression*' will be examined using the stress-diathesis model. From this perspective, attachment will be considered as a developmental diathesis factor and level of interpersonal functioning and depression as environmental risk factors. The latter two variables will be examined as potential mediating environmental risk factors that act on developmental vulnerability factors (attachment) to increase levels of schizotypy. Therefore, the current study will investigate the association between these developmental diathesis and environment risk factors to establish the predictive association of these variables in regard to schizotypy.

The aim of the current research is to establish whether the reported association between schizotypy and attachment styles is independent or whether it is mediated by other psychological mechanisms, namely interpersonal functioning/affect regulation strategies

and depression. Based on the research reviewed that indicates that attachment styles, mediated by the IWM, are an important determinant regarding how the individual regulates distress, it is hypothesized that both attachment style and level of interpersonal functioning will predict schizotypy. Furthermore, based on the association between depression and interpersonal functioning it is further hypothesized that on account of the projected hypothesized association between depression and interpersonal functioning that depression will also predict schizotypy. No hypothesis is formulated in regard to whether depression will mediate or moderate any association between schizotypy and interpersonal functioning.

Therefore, the primary hypothesis of the current study is that schizotypy will be predicted by attachment style and interpersonal functioning. It is hypothesised that both sets of variables will add significantly to the variance explained in schizotypy. The secondary hypothesis of the current study is that levels of schizotypy will be predicted by depression. It is further hypothesised that depression will add significantly to the predictor model that includes variables of attachment and interpersonal functioning. The null hypothesis is that there will be no systematic relationship between variables schizotypy, attachment and depression.

1.8.1 Hypotheses of the Current Study

The current study has a Primary Hypothesis and a Secondary Hypothesis.

1.8.2 Primary Hypothesis

The primary hypothesis of the current study is that level of schizotypy will be predicted by attachment style and interpersonal functioning. It is hypothesised that the inclusion of variable interpersonal functioning to a predictor model that contains variable attachment style will add significantly to the variance explained in variable schizotypy.

1.8.3 Secondary Hypothesis

The secondary hypothesis of the current study is that level of schizotypy will be predicted by depression. It is further hypothesised that depression will add significantly to the variance explained in schizotypy in a predictor model that includes variables of attachment style and interpersonal functioning.

CHAPTER TWO – METHODS

2.1.1 Overview of Methods Chapter

The methodology and research design that were employed to investigate the hypotheses of the current study will be outlined in this chapter. This chapter consists of four sections, namely Participants, Measures, Procedure and Research Design.

2.2.1 Participants

A clinical sample was used to investigate the hypotheses of the current study for the reasons stated in section 1.7.1. This sample was recruited from a level two and a level three psychological service in NHS Tayside. Level two services in Tayside provide psychological therapies for patients with mild to moderate psychological problems that will require less than twenty sessions of intervention. The level two service from which participants were recruited was the Perth Adult Psychological Therapies Service, Murray Royal Hospital, Perth. Level three services in Tayside provide psychological therapies to patients who have severe and enduring psychological difficulties, that necessitate multidisciplinary input and require a psychological intervention that will require more than twenty sessions. The level three service that was used to recruit for the current study was the North Perthshire Community Mental Health Team, Coupar Angus. The demographics, presenting problem(s) and length of contact of those who participated in the current study is detailed in section 3.2.1 and 3.2.2 of the results chapter.

2.2.2 Inclusion and Exclusion Criteria

The inclusion criteria[16] employed to recruit the clinical sample in the current study were (i) patients who gave their consent to participate (ii) were over the age of 18 years (iii) under the age of 65 years and (iv) who were currently presenting with a mental health difficulty at either of the two mental health services in NHS Tayside that were involved in the recruitment process. The exclusion criteria of the current study were patients who (i) had active suicidal intent (ii) currently presented with an acute psychotic disorder,

[16] See Appendix II

such as Schizophrenia or a Bipolar Disorder (iii) were not proficient in English at a conversational level (iv) had a Learning Disability (v) had a Brain Injury or (vi) had a significant drug and/or alcohol dependency.

These criteria were employed so valid and reliable data that could investigate the hypotheses were satisfactorily obtained. No individual was unfairly excluded from the study. The Chief Investigator liaised closely with the clinicians in each of the recruitment settings to ensure that the latter were aware of the inclusion and exclusion criteria and applied them appropriately.

2.3.1 Measures

This section will detail the questionnaires that were used in the current study. Participants completed the Schizotypal Personality Questionnaire[17] (SPQ: Raine, 1991), the Relationship Questionnaire[18] (Bartholomew & Horowitz, 1991), the Inventory of Interpersonal Problems-32[19] (Barkham *et al.,* 1996) and the Beck Depression Inventory-II[20] (Beck *et al.,* 1996). These questionnaires have been employed extensively in both research and clinical practice. They were chosen on the basis of ease of completion and research evidence that indicated that they were reliable and valid measures. The only alterations made to these questionnaires, for use in the current research, were that the section of each questionnaire that required participants to indicate name, age and gender were deleted. These alterations were made to ensure that the anonymity of the participants was maintained. Further to this, the clinician of each participant was required to complete the Demographic Information Questionnaire (DIQ)[21] on behalf of the patient that s/he recruited into the study.

2.3.2 Schizotypal Personality Questionnaire

The Schizotypal Personality Questionnaire (SPQ: Raine, 1991) is a self-report measure that is employed to assess schizotypic symptoms. Participants were required to rate each of the 74 questions as either '*Yes'* or '*No*'. Higher scores on the SPQ indicate more prevalent levels of schizotypy than lower scores. The SPQ generates scores for three domain factors of schizotypy (also referred to as '*first order schizotypal dimensions*'), namely '*Cognitive Perceptual*', '*Interpersonal*' and '*Disorganisied*'. The SPQ also generates scores for nine sub-scales (also referred to as second order schizotypal dimensions), namely '*Ideas of Reference'; 'Magical Thinking'/'Odd Beliefs'; 'Unusual Perceptual Experiences'; 'Suspiciousness/Paranoid Ideation'; 'Social Anxiety'; 'No Close Friends'; 'Constricted Affect'; 'Odd/Eccentric Behaviour'* and *'Odd Speech'.*

[17] See APPENDIX III
[18] See APPENDIX IV
[19] See APPENDIX V
[20] See APPENDIX VI
[21] See APPENDIX VII

The sub-scales of the SPQ that correspond to domain factor 'Cognitive-Perceptual' are: '*Ideas of Reference'; 'Magical Thinking/ Odd Beliefs'; 'Unusual Perceptual Experiences*' and '*Suspiciousness/Paranoid Ideation'*. The sub-scales of the SPQ that correspond to domain factor '*Interpersonal*' are: *'Social Anxiety'; 'No Close Friends'* and *'Constricted Affect'*[22]. The sub-scales of the SPQ that correspond to domain factor *'Disorganisied'* are *'Odd/Eccentric Behaviour',* and *'Odd Speech'.* The sub-scales of the SPQ that correspond to the positive symptoms of schizotypy are: '*Ideas of Reference'; 'Magical Thinking'/'Odd Beliefs'; 'Unusual Perceptual Experiences'; '<u>Suspiciousness/Paranoid Ideation'; 'Odd/Eccentric Behaviour'</u>* and *'Odd Speech'*. The sub-scales of the SPQ that correspond to the negative symptoms of schizotypy are: *'Social Anxiety'; 'No Close Friends'* and *'Constricted Affect'*.

The SPQ measure has shown good internal validity, test-retest reliability, convergent validity and discrimant validity (Raine, 1991). The SPQ is considered to be a good measure of schizotypy (Tiliopoulos & Goodall, 2009) and no adverse effects from completing the questionnaire have been documented in the literature.

2.3.3. The Relationship Questionnaire

The Relationship Questionnaire (RQ: Bartholomew & Horowitz, 1991) is a self-report measure that is used to classify participants into their most appropriate attachment style. This questionnaire is comprised of four short statements, each of which describes '*Secure', 'Preoccupied', 'Fearful*' or a '*Dismissing*' attachment pattern as they apply in close adult peer relationships. Firstly, participants were asked to read each statement and identify the statement that best describes the participant or is closest to the way the participant generally is in close relationships. Secondly, participants were asked to rate each of the relationship styles according to the extent to which they thought each description corresponded to their general relationship style on a 1 -7 likert scale. On this scale, 1 related to '*Not at all like me*', 4 related to '*Somewhat like me*' and 7 related to '*Very much like me*'. The RQ was used in the current study to classify attachments styles

[22] Debate exist regarding whether sub-scale suspiciousness should be included in domain factor '*Cognitive-Perceptual*' or '*Interpersonal*'. In the current study it is included under domain factor '*Cognitive-Perceptual*'.

in accordance with the four main attachment patterns that are hypothesised in the Bartholomew & Horowitz (1991) model of adult attachment[23]. The RQ has been shown to have good reliability and validity (Griffin & Bartholomew, 1994). The RQ is considered to be a good measure of adult attachment (Ravitz *et al*., 2010) and no adverse effects from completing the questionnaire have been documented in the literature.

2.3.4 Inventory of Interpersonal Problems-32

The Inventory of Interpersonal Problems-32 (IIP-32: Barkham *et al.,* 1996) is a self-report questionnaire that is used to assess difficulties people experience in their interpersonal relationships. The IIP-32 generates a total score for overall level of interpersonal problems and a score for each of the eight sub-scales. The eight sub-scales of the IIP-31 are: *'Hard to be Sociable'*; '*Hard to be Assertive'*; '*Too Aggressive'; 'Too Open'; 'Too Caring'; 'Hard to be Supportive'; 'Hard to be Involved'* and *'Too Dependent'*. Respondents rate each of the 32 items on a 5 point likert scale ranging from 0, which equates to "*Not at all*" to 4 which equates to '*Extremely like me*'. Research evidence indicates that the IIP-32 is a reliable and valid measure of interpersonal functioning (Barkham *et al*., 1996). No adverse effects from completing this questionnaire have been documented in the literature.

2.3.5 The Beck Depression Inventory-II

The Beck Depression Inventory-II (BDI-II: Beck *et al., 1996)* is a 21 item self-report measure that is used to assess for the presence and severity of cognitive, behavioural and somatic symptoms of depression. Respondents read a group of four statements for each of the 21 items and chose the option that best described how they felt over the past week. For example, for question 9 respondents must chose one of the following four options: (0) '*I do not feel sad*', (1) 'I feel sad", (2) '*I feel sad all the time and can't snap out of it*', (3) '*I am so sad or unhappy that I can't stand it*'. The BDI-II generates an overall score for depression. Overall scores of 0–13 indicate minimal depression; scores of 14–19 indicate mild depression; overall scores of 20–28 indicate moderate depression and overall scores of 29–63 indicate severe depression (Beck, *et al*., 1996). The BDI-II is one

[23] The RQ can also be scored to classify attachments as either '*Attachment Anxiety*' or '*Attachment Avoidance*'.

of the most frequently used measures to assess depression for both research and clinical purposes. The BDI-II has been shown to have good internal validity and test-retest reliability in both clinical and non-clinical populations (Beck, Steer, & Garbin, 1988). No adverse effects from completing this questionnaire have been documented in the literature.

2.3.6 Demographic Information Questionnaire

The Demographic Information Questionnaire (DIQ) was designed by the Chief Investigator. The clinician[24] was required to complete the DIQ on behalf of each patient that s/he recruited into the study. The information required for this questionnaire was, participant age, gender, post code, relationship status, occupation, presenting problem(s) / diagnosis/diagnoses and length of contact with mental health services.

[24] Adhering to a protocol whereby the clinician completed the DIQ was considered the most ethical approach to obtain the demographic information required for the study as it did not require the Chief Investigator to access any participant file.

2.4.1 Procedure

Participants were recruited from the two aforementioned sites within NHS Tayside. To facilitate this, the Chief Investigator attended a monthly team meeting or a weekly referral meeting at these locations. The Chief Investigator fully briefed all clinicians on (i) the aims of the proposed research (ii) all consentual issues pertaining to the research (iii) the requirements of those who agree to participate and (iv) the inclusion and exclusion criteria for the study.

The next phase of recruitment involved the clinicians identifying potential participants in their caseload who were appropriate for the study. On account of their professional training it was assumed that clinicians would have the aptitude to apply the inclusion and exclusion criteria appropriately and consistently when identifying participants in their caseloads who would be suitable for the study. There were no stipulation in the inclusion and exclusion criteria regarding the stage of treatment a participant had to be at to be considered for participation. Therefore, the inclusion and exclusion criteria notwithstanding, clinicians could invite a patient from their caseload to participate regardless of stage of treatment. Further to this, clinicians introduced the research with these patients at a routine appointment. Clinicians provided potential participants with a verbal synopsis of the proposed research and an information pack. The information pack consisted of a Participant Information Sheet[25], a Consent Form[26] and the questionnaires. The information sheet provided an overview of the research and detailed all relevant ethical issues pertaining to the research.

Potential participants were invited by the clinicians to take the information packs away, read the information sheet and reflect on whether they wish to participate. This recruitment strategy provided patients who wished to participate with ample time to complete the consent form and questionnaires and return them to their clinician. Participants had the option to return questionnaires at either a follow up appointment or by mail via a freepost envelope that was addressed to their clinician. Patients who did not

[25] See Appendix VIII
[26] See Appendix IX

return the consent form or questionnaires were not prompted to do so. As a consequence no participant was pressurized to engage in the current study.

In situations where packs were returned to the clinician the latter was required to check that the consent form has been signed. Once the clinician had confirmation that this was the case, the latter completed the DIQ on behalf of the participant. It was clearly stated on both the DIQ and in the information sheet that it was the responsibility of the clinician to complete this questionnaire. Once the DIQ had been completed, the clinician returned the consent form and completed questionnaires to the Chief Investigator. On receipt of the completed questionnaire packs the Chief Investigator (i) checked that the consent form had been signed and questionnaires completed and (ii) screened the completed BDI-II to ensure that the participant was not actively suicidal. The criteria used to determine active suicidal intent was a score of 3 on question 9 of the BDI-II (Beck *et al*., 1996). In a scenario where this situation occurred it was agreed that the Chief Investigator would be ethically and professionally obliged, as a consequence of his duty of care, to breach confidentiality and contact the clinician of the relevant participant to ensure that an appropriate care strategy had been formulated and actioned. The patient information sheet indicated that this procedure would be adhered to in a scenario where a patient indicated active suicidal intent. However, during the course of recruitment no information packs were returned with a score of 3 on question 9 on the BDI-II.

Further to this the Chief Investigator labeled each individual consent form and its corresponding questionnaires with a participant code. This procedure was necessary to safeguard against a scenario in which the Chief Investigator needed to remove participant information from the database[27]. The consent forms were kept separately from the questionnaires and both were locked in separate filing cabinets in a secure NHS premise. The Chief Investigator was the only individual with access to same.

All data obtained from the questionnaires were inputted into an SPSSv13 database on a NHS computer for data purposes only. There was no identifying information relating to the participants recorded in the SPSSv13 database and consequently none reported in the

[27] This scenario could have occurred in a situation where a participant stated that they no longer agreed for their data to be used in the study or where they lost capacity subsequent to providing consent.

findings of the research. The statistical computer packages SPSSv13 and EQS version 6.1 were used to analyse the data to investigate the validity of the hypotheses. After the research had been completed and the study written up as a thesis all questionnaires and consent forms were shredded and disposed of in NHS confidential waste facilities. All data collected in the current study was collected and stored in accordance with the Data Protection Act (1998).

2.4.2 Ethical Process

An ethical application was submitted and approved by the Tayside Committee on Medical Research Ethics[28]. Likewise, approval from the Research and Development of the local NHS area was obtained[29]. Finally, Caldicott approval was not required as access to patient file was not required.

[28] See Appendix X
[29] See Appendix XI

2.5.1 Research Design: Overview

A cross-sectional quantitative group research design using a clinical sample was used in the current study to investigate the research hypotheses. Participants were required to complete the following self-report questionnaires: Schizotypal Personality Questionnaire (SPQ: Raine, 1991); the Relationship Questionnaire (RQ: Bartholomew & Horowitz, 1991); Inventory of Interpersonal Problems-32 (IIP-32: Barkham *et al.*, 1996) and the Beck Depression Inventory II (BDI-II: Beck *et al*., 1996). Additionally, the clinician of each respective participant was required to complete the Demographics Information Questionnaire (DIQ) on behalf of their patient. The data obtained from these questionnaires were inputted and analyzed using the computer software programme SPSSv.13. Quantitative methodologies, namely basic descriptive statistics, correlational analysis, hierarchical regression analysis and structural equation modeling, were used to investigate the hypotheses.

2.5.2 Research Design: Primary Hypothesis

The primary hypothesis of the current study was that level of schizotypy would be predicted by attachment style and interpersonal functioning. It was hypothesised that the inclusion of variable interpersonal functioning to a predictor model that contained variable attachment style would add significantly to the variance explained in variable schizotypy. The predictive association between these psychological variables was tested using hierarchical linear regressions.

2.5.3 Research Design: Secondary Hypothesis

The secondary hypothesis of the current study was that level of schizotypy would be predicted by depression. It was further hypothesised that depression would add significantly to the variance explained in schizotypy in a predictor model that included variables of attachment style and interpersonal functioning. The secondary hypothesis was tested using hierarchical linear regressions.

2.5.4 Research Design: Null Hypothesis

The null hypothesis was there would be no systematic relationship observed between variables schizotypy, attachment, interpersonal functioning and depression. Testing the primary and secondary hypotheses tested the validity of the null hypothesis by proxy.

2.5.5 Research Design: Statistical Analysis

A power analysis was computed prior to participant recruitment (see section 3.3.2). Exploratory analysis using basic descriptive statistics and correlational analysis were computed to obtain a preliminary overview of the association between these variables. The primary and secondary hypotheses were tested using hierarchical linear regressions. Follow-up analysis were computed using structural equation modeling. Two mediation path models were conducted to further investigate the hypothesised relationships between the main variables of the current study.

CHAPTER THREE – RESULTS

3.1.1 Overview of Results Chapter

This chapter details the results of the current research. Firstly, the descriptives of the clinical sample used are presented. Secondly, the assumptions regarding the use of regression analysis and the procedures employed in the current study to assess that these assumptions were not violated are outlined. Thirdly, an overview of the basic descriptives statistics for each of the main variables used and the results of the analysis in relation to each of the hypotheses are presented.

3.2.1 Demographics: Gender, Age and Occupational Status

Participants were 66 outpatients who were attending level two or level three psychological services in the Tayside area. The sample consisted of 17 males (25.76%) and 49 females (74.24%). The mean age of the sample was 39.30 years (std. deviation = 11.33 years, range = 49 years). Of the sample, 42 (63.64%[30]) were in romantic relationships, of which 24 (36.37%) were married, 12 (18.18%) were living with their partner and 6 (9.09%) were in a relationship but living alone. Twenty four (36.36%) participants in the sample were single, of which seven (10.60%) were separated/divorced. In the sample, 48 (72.73%) were in employment, 16 (24.24%) were unemployed and 2 (3.03%) were retired.

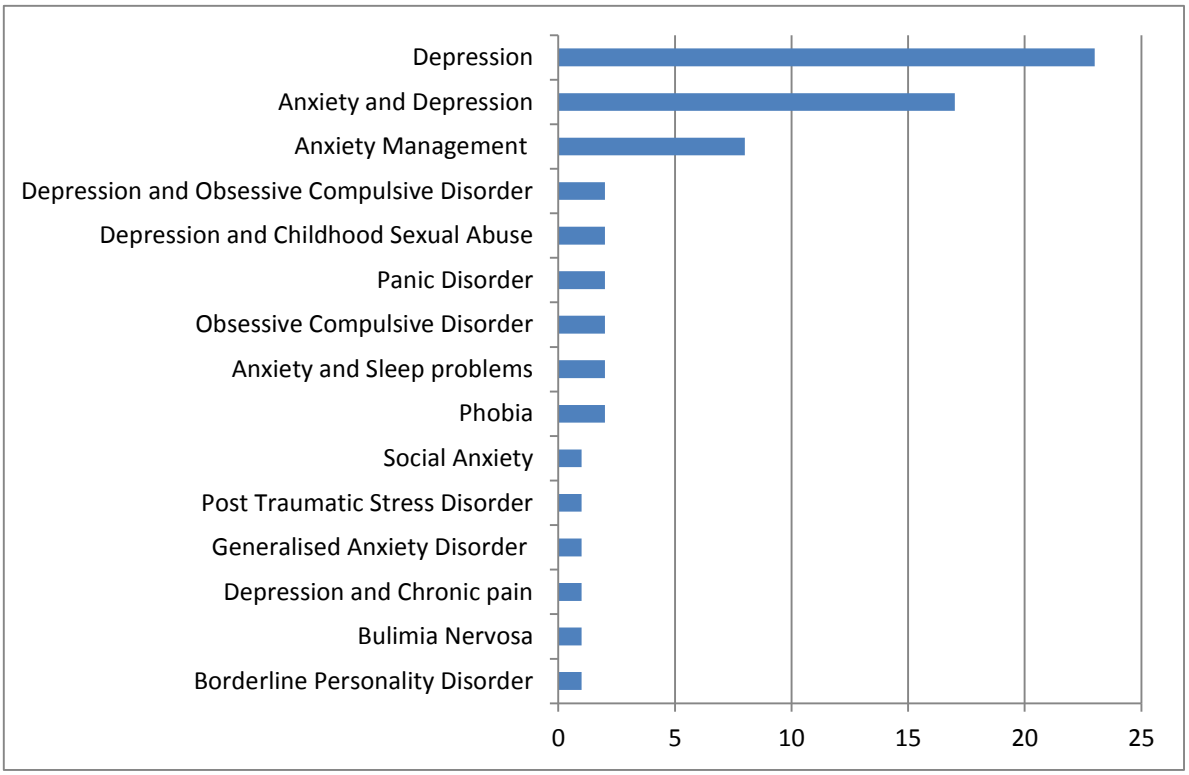
3.2.2 Demographics: Presenting problem (s) and Length of Contact with Mental Health Services

The mean length of time in contact with psychological/psychiatric services for the sample was 22.94 months (std. deviation = 44.73, range = 239 months). The presenting problem (s) of the participants in the sample, as recorded verbatim on the demographic information questionnaire, were as follows: '*Depression*' (n = 23); '*Anxiety and Depression*' (n = 17); '*Anxiety Management*' (n = 8); '*Depression and Obsessive Compulsive Disorder*' (OCD) (n = 2);

[30] Percentage indicated relates to percentage of the total sample.

'*Depression and Childhood Sexual Abuse*' (CSA) (n = 2); '*Panic Disorder*' (n = 2); '*OCD'* (n = 2); '*Anxiety and Sleep Problems'* (n = 2); '*Phobia'* (n = 2); '*Social Anxiety*' (n = 1); '*Post Traumatic Stress Disorder*' (n = 1); '*Generalised Anxiety Disorder*' (n = 1); '*Depression and Chronic Pain*' (n = 1); '*Bulimia Nervosa*' (n = 1); '*Borderline Personality Disorder'* (n = 1). This information is displayed visually in figure 3.1.

Figure 3.1: Frequency Statistics for Presenting Problems [31].



[31] X axis equals number of participants, Y axis equals presenting problems.

3.3.1 Assumptions of Regression Analysis

The use of regression analysis requires appropriate statistical power (Fields, 2009) and that the distribution of the data does not violate the assumptions in regard to normality, linearity, homoscedasticity and independence of residuals (Hair *et al.,* 2010). The procedures and statistical methods employed to test whether these assumptions were violated will now be discussed.

3.3.2 Power Analysis

A power calculation was computed to determine the number of participants that were required to investigate the hypotheses using regression analysis. This power analysis indicated that a sample of 50 participants was required to detect a large effect size using multiple regression analysis with three independent variables (Cohen, 1992). The current study used a sample of 66 participants and was considered to be adequately powered for the planned analysis.

3.3.3 Distribution: Normality of Data

The use of regression analysis statistical methods requires that the data are normally distributed. A visual assessment of the data distribution using histograms indicated that the data was normally distributed for each of the main variables. The skewness and kurtosis values for each of the main variables are displayed in Table 3.1. Skewness is a measure of symmetry relative to the normal distribution with scores greater than one indicating that the skew of the data is asymmetrical (Dancy and Reidy, 2008). Skewness scores were computed by dividing the statistic score for each variable by the standard error. The corresponding p value for each z score was acquired using the standard normal table. The skewness scores for each of the variables indicated that no variable was significantly skewed. Kurtosis scores provide a measure of the flatness of the distribution with a score above one indicating that the distribution of the data is deviating significantly relative to a normal distribution (Dancy and Reidy, 2008). Kurtosis scores were computed by dividing the statistic score for each variable by the standard error. The corresponding p value for each z score was acquired using the standard normal table. The

kurtosis scores for the main variables indicated that variable '*Insecure-Dismissing'* was the only variable that was leptokurtic. The kurtosis score for this variable was -1.06 (z = 1.83, p = +/- 0.07) indicating that it was marginally leptokurtic. However, this score was not deemed to be leptokurtic to the extent that it violated the assumptions of normality. On the basis of the distribution of the data it was concluded that the data were normally distributed.

	Skewness				**Kurtosis**			
	Statistic	**Std. Error**	**Z Score**	**P value (Two Tailed +/-)**	**Statistic**	**Std. Error**	**Z Score**	**P value (Two Tailed +/-)**
SPQ	.17	.30	0.57	0.57	-0.72	.58	1.24	0.22
Attachment-Secure	.81	.30	2.70	0.01	-0.77	.58	1.33	0.18
Attachment-Fearful	-.60	.30	-0.20	0.84	-0.79	.58	1.36	0.17
Attachment-Dismissing	.39	.300	0.13	0.90	-1.06	.58	1.83	0.07
Attachment-Preoccupied	.41	.30	0.14	0.89	-0.57	.58	0.98	0.33
IIP-32	-.21	.30	0.07	0.94	-0.34	.58	0.59	0.56
H. Sociable	-.16	.30	0.53	0.60	-0.50	.58	0.86	0.39
H. Assertive	-.24	.30	0.08	0.94	-0.78	.58	1.34	0.18
T. Aggressive	1.07	.30	3.57	0.00	1.80	.58	3.10	0.00
T. Open	.65	.30	2.17	0.03	-0.16	.58	0.28	0.78
T. Caring	-.10	.30	0.33	0.74	-0.45	.58	0.78	0.44
H. Supportive	.78	.30	2.60	0.01	-0.27	.58	0.47	0.64
H. Involved	.09	.30	0.30	0.76	-0.73	.58	1.26	0.21
T. Dependent	.33	.30	1.10	0.27	-0.44	.58	0.76	0.45
BDI-II	-.00	.30	0.00	01.0	-0.71	.58	1.22	0.22

Table 3.1: Descriptive Statistics for Skewness and Kurtosis Scores.

3.3.4 Linearity

Multicollinearity exists where there is a perfect/strong linear relationship between two or more of the predictor variables in a regression analysis. The variables used in regression analysis should not be highly linearly related (Hair e*t al.,* 2010). A '*Variance Inflation Factor*' (VIF) in excess of 10 indicates a problematic level of multicollinearity (Myer, 1990). A VIF value was calculated for each regression analysis that was computed in the current study. No score in excess of 10 was reported for any of the regression analyses computed. On the basis of the VIF scores it was concluded that the assumption of linearity was not violated in the current study.

3.3.5 Homoscedasticity

Homoscedasticity exists where there is limited variance in the residual between predictor variables used in the regression analysis. Heteroscedasticity occurs where there is significant variation in the residual between predictor variables. The variance of residual between each predictor variable used in a regression analysis should be homogeneous (Fields, 2009). The homogeneity of variance in the current study was investigated by completing a visual examination of the boxplots for all variables used in the analysis. This analysis suggested that the variance across the variables was relatively homogeneous. On this basis it was concluded that the assumption of homoscedasticity was not violated.

3.3.6 Independence of Residuals

The Independence of Residuals (IOR) for the predictor variables used in a regression analysis is violated when the residual terms are highly correlated. A '*Durbin-Watson*' (DW) score in excess of three is considered to indicate problematic IOR values. A DW score was computed for each of the regression analyses calculated. No score in excess of three was reported. On the basis of the DW scores it was concluded that the assumption of IOR had not been violated.

3.4.1 Exploratory Analysis: Basic Descriptives and Frequency Statistics

All statistics reported are based on full data (N = 66) sets only as incomplete data (N = 5) sets were excluded from the analysis. Basic descriptive statistics for each of the main variables used in the analysis are displayed in table 3.2.[32] The descriptive statistics for *'SPQ', 'IIP-32'* and '*BDI-II*' were computed from the total scores for these questionnaires. The descriptive scores for the attachment styles were computed from the likert scores from section two of the '*Relationship Questionnaire*'. Table 3.3 displays the frequency statistics for attachment styles. These are based on the categorical scores derived from section one of the '*Relationship Questionnaire*' where participants were required to chose one of the four attachment styles that most closely described their overall relationship style.

The mean and range scores for the descriptive statistics indicated that moderate to high scores for '*SPQ'*, '*IIP-32'* and '*BDI-II*' scores were prevalent in the sample. The frequency statistics indicated that 78.8% of the sample chose an insecure attachment style to describe the way they generally are in close relationships. Of note, only seven participants (10.6% of sample) indicated an overall '*Attachment-Preoccupied*' attachment style.

	Range	Minimum	Maximum	Mean	Standard Deviation
SPQ	57.00	1.00	58.00	27.53	14.80
Attachment-Secure	6.00	1.00	7.00	2.79	2.00
Attachment-Fearful	6.00	1.00	7.00	4.77	2.00
Attachment-Dismissing	6.00	1.00	7.00	3.26	1.66
Attachment-Preoccupied	6.00	1.00	7.00	4.77	2.01
IIP-32	81.00	4.00	85.00	48.45	18.54
H. Sociable	16.00	0.00	16.00	7.44	3.50
H. Assertive	15.00	0.00	15.00	7.65	4.00
T. Aggressive	13.00	1.00	14.00	4.80	2.50
T. Open	9.00	0.00	9.00	3.59	2.45
T. Caring	12.00	0.00	12.00	5.56	2.74
H. Support	16.00	0.00	16.00	4.76	4.48
H. Involved	16.00	0.00	16.00	7.88	4.17
T. Dependent	15.00	1.00	16.00	6.77	3.34
BDI-II	49.00	.00	49.00	23.59	11.70

Table 3.2: Descriptive Statistics for Main Variables.

	Frequency	%
Attachment-Secure	14	21.2
Insecure-Fearful	33	50
Insecure-Dismissing	12	18.2
Insecure-Preoccupied	7	10.6

Table 3.3: Frequency Statistics for Attachment Styles.

[32] The descriptives for the Sub-Scales for the SPQ are detailed in Appendix XII.

3.4.2 Exploratory Analysis: Main Variables

To obtain an overview of the association between the main variables, correlations were computed between variables '*SPQ', 'Attachment-Secure', 'Insecure-Fearful', 'Insecure-Dismissing', 'Insecure-Preoccupied', 'IIP-32'* and *'BDI-II'*. There was a correlation observed between '*SPQ'* and '*Attachment-Secure*' ($r = -.37$, $p < .01$), '*Insecure-Fearful'* ($r = .39$, $p < .01$) and '*Insecure-Dismissing* ($r = .29$, $p < .05$). There was no significant correlation observed between '*SPQ'* and *'Insecure-Preoccupied'* ($r = .16$, $p < .05$). There were also correlations observed between '*SPQ'* and '*IIP-32*' ($r = .77$, $p < .01$) and between '*SPQ'* and '*BDI-II*' ($r = .63$, $p < .01$). The results of these correlations are displayed in table 3.4.

	SPQ	Attachment -Secure	Attachment -Fearful	Attachment - Dismissing	Attachment-Preoccupied	IIP-32	BDI-II
SPQ	1	**-.37****	**.39****	**.29***	.16	**.77****	**.63****
Attachment-Secure	**-.37****	1	**-.60****	**-.36****	-.17	**-.37****	-.13
Attachment-Fearful	**.39****	-.60**	1	.22	.17	**.39****	.15
Attachment-Dismissing	**.29***	**-.36****	.22	1	-.20	**.26***	.17
Attachment-Preoccupied	.16	-.17	.17	-.20	1	.22	-.12
IIP-32	**.77****	**-.37****	**.39****	**.26***	.22	1	**.50****
H. Sociable	**.57****	**-.34****	**.43****	.10	**.29***	**.79****	**.35****
H. Assertive	**.66****	**-.38****	**.34****	.16	**.26***	**.81****	**.44****
T. Aggressive	**.34****	**-.29***	.20	.14	**.35****	**.51****	.20
T. Open	**.49****	**-.28***	.23	**.37****	.09	**.57****	.20
T. Caring	**.35****	.03	.19	-.02	.20	**.64****	**.29***
H. Support	**.56****	-.21	.19	**.34****	-.24	**.61****	**.39****
H. Involved	**.61****	**-.29***	**.30***	**.25***	.12	**.82****	**.43****
T. Dependent	**.463****	-.208	.213	.033	**.296***	**.593****	**.302***

Table 3.4: Table of Correlations for Main Variables.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

3.5.1 Primary Hypothesis

The primary hypothesis of the current study is that level of schizotypy will be predicted by attachment style and interpersonal functioning. It was hypothesised that the inclusion of interpersonal functioning in a predictor model that contained variable attachment style will add significantly to the variance explained in variable schizotypy. The predictive association between these psychological variables will be tested using hierarchical linear regressions.

3.5.2 Primary Hypothesis: Schizotypy and Attachment Style - Correlational Analysis

As noted in 3.2.2 significant correlations were observed between '*SPQ*' and '*Attachment-Secure*', *'Insecure-Fearful'* and *'Insecure-Dismissing'*. Follow-up correlational analysis was computed to investigate the relationship between each of the attachment styles to the each of the three main domain factors of the SPQ, namely '*SPQ-Cognitive-Perceptual*', '*SPQ-Interpersonal*' and '*SPQ-Disorganised*'. There were significant correlations observed between '*SPQ-Interpersonal'* and '*Attachment-Secure*' ($r = -.48$, $p < .01$), *'SPQ-Interpersonal'* and '*Insecure-Fearful'* ($r = .50$, $p < .01$) and '*SPQ-Interpersonal'* and '*Insecure-Dismissing'* ($r = .30$, $p < .05$). No other significant correlations were observed between any other attachment style and the domain factors of the SPQ. The results of these correlations are displayed in table 3.5.

	SPQ: Cognitive-Perceptual	**SPQ: Interpersonal**	**SPQ: Disorganised**
Attachment-Secure	-.12	**-.48****	-.24
Insecure-Fearful	.19	**.50****	.22
Insecure-Dismissing	.19	**.30***	.24
Insecure-Preoccupied	.11	.12	.21

Table: 3.5: Table of Correlations for SPQ Domain Factors and Attachment Styles.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Finally, correlations were computed to investigate the relationship between each attachment style to each of the nine sub-scales of the SPQ. This analysis indicated that for domain factor '*SPQ-Cognitive-Perceptual*', '*Attachment-Secure*' was correlated with sub-scale '*Odd Beliefs*' ($r = -.25$, $p < .05$) and '*Suspiciousness*' ($r = -.29$, $p < .05$); '*Insecure-Fearful*' was correlated with sub-scale '*Suspiciousness*' ($r = .35$, $p < .01$). '*Insecure-Dismissing'* was correlated with sub-

scale '*Unusual Perceptual Experiences*'(r = .25, p < .05). This information is displayed in table 3.6.

For domain factor '*SPQ-Interpersonal'*, '*Attachment-Secure'* was negatively correlated with sub-scales '*Social Anxiety'* (r = -.41, p < .01), *'No friends'* (r = -.45, p < .01) and '*Constricted Affect*' (r = -.43, p < .01). '*Insecure-Fearful*' was positively correlated with sub-scales '*Social Anxiety'* (r = .45, p < .01), *'No friends'* (r = .35, p < .01) and '*Constricted Affect*' (r = .49, p < .01). '*Insecure-Dismissing*' was correlated with sub-scales *'No Friends'* (r = .39, p < .01) and '*Constricted Affect*' (r = .28, p < .05). This information is displayed in table 3.7. In regard to domain factor '*SPQ-Disorganised*', positive correlations were observed between '*Insecure-Dismissing*' and sub-scale '*Odd Behaviour*' (r = .31, p < .05), and between *Insecure-Preoccupied*' and sub-scale '*Odd Behaviour'* (r = .31, p < .05). This information is displayed in table 3.8.

	SPQ: Cognitive-Perceptual			
	Ideas of Reference	**Odd beliefs**	**Unusual Perceptual Experiences**	**Suspiciousness**
Attachment-Secure	-.05	**-.25***	-.06	**-.29***
Insecure-Fearful	.12	.23	.14	**.35****
Insecure-Dismissing	.08	.13	**.25***	.14
Insecure-Preoccupied	.16	.05	.05	.20

Table 3.6: Table of Correlations for Attachment Styles and Sub-Scales of SPQ: Cognitive-Perceptual.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

	SPQ: Interpersonal		
	Social Anxiety	**No friends**	**Constricted affect**
Attachment-Secure	**-.41****	**-.45****	**-.43****
Insecure-Fearful	**.45****	**.35****	**.49****
Insecure-Dismissing	.17	**.39****	**.28***
Insecure-Preoccupied	.13	-.01	.07

Table 3.7: Table of Correlations for Attachment Styles and Sub-Scales of SPQ: Interpersonal.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

	SPQ: Disorganised	
	Odd Behaviour	**Odd Speech**
Attachment-Secure	-.22	-.18
Insecure-Fearful	.14	.22
Insecure-Dismissing	**.31***	.11
Insecure-Preoccupied	.01	**.33****

Table 3.8: Table of Correlations for Attachment Styles and Sub-Scales of SPQ: Disorganisied.

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Summary: '*SPQ*' score was negatively correlated with '*Attachment-Secure*' and positively correlated with '*Attachment-Fearful*' and '*Attachment-Dismissing*'. However no correlation was observed between '*SPQ*' and '*Attachment-Preoccupied*' attachment style. Domain factor '*SPQ-Interpersonal*' was the only domain factor that was correlated with any of the attachment styles.

3.5.3 Primary Hypothesis: Schizotypy and Interpersonal Functioning - Correlational Analysis

As noted in 3.2.2 a positive correlation was observed between '*SPQ'* and '*IIP-32*' ($r = .77$, $p < .01$). To further investigate this relationship, correlations were computed between the domain factors of the SPQ and '*IIP-32*'. Strong correlations were observed between '*IIP-32*' and '*SPQ-Cognitive-Perceptual*' ($r = .61$, $p < .01$), '*SPQ-Interpersonal*'($r = .71$, $p < .01$) and '*SPQ-Disorganised*' ($r = .62$, $p < .01$). Further correlational analysis were completed to investigate the relationship between the domain factors of the SPQ and the sub-scales of the '*IIP-32'*. Of note, domain factors '*SPQ-Cognitive-Perceptual*' and the '*SPQ Disorganisied'* were strongly correlated with each sub-scale of the IIP-32. In regard to domain factor '*SPQ Interpersonal*' and the sub-scales of '*IIP-32*', only sub-scales '*Too Aggressive'* and *'Too Caring'* were not correlated. The results of these correlations are displayed in table 3.9. Finally, correlations were computed between the sub-scales of the SPQ and the sub-scales of the IIP-32. On account of the large number of significant correlations observed between these sub-scales, the results of these correlations are reported in table 3.10 only.

Summary: '*SPQ*' and all SPQ domain factors scores were positively correlated with '*IIP-32*'. A significant number of positive correlations were observed between the SPQ domain factors and the sub-scales of IIP-32 and between the sub-scales of SPQ and the sub-scales of IIP-32.

	H. Social	H. Assertive	T. Aggressive	T. Open	T. Caring	H. Supportive	H. Involved	T. Dependent
SPQ: Cog-Per	**.36****	**.51****	**.32****	**.35****	**.44****	**.41****	**.40****	**.52****
SPQ: Inter	**.62****	**.68****	.21	**.41****	.20	**.53****	**.64****	**.34****
SPQ: Dis	**.41****	**.43****	**.42****	**.51****	**.28***	**.47****	**.46****	**.34****

Table 3.9: Table of Correlations for SPQ Domain Factors and Sub-Scales of IIP-32.

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

	H. Social	H. Assertive	T. Aggressive	T. Open	T. Caring	H. Supportive	H. Involved	T. Dependent
SPQ: Cog-Per								
Ideas of Reference	**.33****	**.49****	**.35****	.23	**.39****	**.26***	**.36****	**.51****
Odd Beliefs	.16	**.25***	.23	**.31***	**.30***	**.32****	.18	**.29***
Unusual Perceptual Experiences	**.36****	**.44****	.19	**.34****	**.38****	**.43****	**.38****	**.41****
Suspiciousness	**.39****	**.42****	**.31***	**.40****	**.37****	**.40****	**.31***	**.61****
SPQ: Inter								
Social Anxiety	**.59****	**.67****	**.26***	.21	.18	**.32****	**.58****	**.29***
No Close Friends	**.50****	**.59****	.07	**.43****	.08	**.57****	**.59****	.10
Constricted Affect	**.54****	**.59****	.05	**.31***	.02	**.46****	**.61****	.11
SPQ: Dis								
Odd Behaviour	.22	**.30***	**.33****	**.49****	**.25***	**.46****	**.38****	**.26***
Odd Speech	**.45****	**.41****	**.38****	**.38****	.23	**.34****	**.40****	**.31***

Table 3.10: Table of Correlations for Sub-Scales of SPQ and Sub-Scales of IIP-32.

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

3.5.4 Primary Hypothesis: Schizotypy, Attachment Style and Interpersonal Functioning[33]

A hierarchical linear regression was computed to investigate the association between Schizotypy, Attachment Style and Interpersonal Functioning. *'SPQ'* was entered as the dependent variable and '*Attachment Styles',* (*'Attachment-Secure', 'Insecure-Fearful', 'Insecure-Dismissing' and 'Insecure-Preoccupied'*) in predictor block one. IIP-32 ('*Hard to be Social*', '*Hard to be Assertive*', '*Too Aggressive*', '*Too Open*'. '*Too Caring*', '*Hard to be Supportive*', '*Hard to be Involved*' and '*Too Dependent*') was entered into predictor block two. The Durbin-Watson value for this model was 1.7 and all VIF scores were significantly less than 10. These scores suggests that the assumptions of independence of residuals and linearity were not violated in this model.

The variance accounted for in '*SPQ*' by attachment style (Model 1) was 18% (Adjusted $R^2 = 0.18$, F (df: 4, 61) = 4.5, $p < .01$). This information is displayed in table 3.11. The data in the table of coefficients, displayed in table 3.12, indicates that none of the attachment styles alone were making a significant contribution to the '*SPQ*'. '*Insecure-Fearful*' (t (61) = 1.8; p = 0.07) and '*Insecure-Dismissing'* (t (61) =1.8; p = 0.07) were marginally insignificant but the associated t-values for these predictors were small.

The variance accounted for in '*SPQ'*, by '*Attachment Styles*' and IIP-32 (Model 2) was 63% (Adjusted $R^2 = .63$, F (12, 53) = 10.15, $p < .001$). The addition of IIP-32 to block two accounted for an extra 47% of variance (R Square change = 0.47, F change = 10.20, (df: 8, 53), $p < .01$) in SPQ. This information is displayed in table 3.11. The output data in the table of coefficients indicated that '*Hard to be Assertive'* (t (53) = 2.11, $\beta = .35$, $p < .05$), '*Hard to be Supportive*' (t (53) = 3.34, $\beta = .52$, $p < .01$) and '*Too Dependent'* (t (53) = 3.39, $\beta = .39$, $p <. 01$) were significant predictors of SPQ. The p value for '*Too Caring'* (t (53) = -.20, $\beta = -.25$ p = .05) indicated that this variable was bordering as a significant contributor to the model. The standardised beta values indicate that '*Hard to be Assertive'* and *'Too Dependent'* were making broadly similar contributions to the model and *'Hard to be Supportive'* was the most significant contribution to the model. The coefficients for this model are displayed in table 3.12.

[33] Appendix XIII contains the Table of Correlations for Attachment Styles and Sub-Scales of IIP-32.

					Change Statistics					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin-Watson**
1	.48	.23	.18	13.41	.23	4.5	4	61	.003	
2	.84	.70	.63	9.02	.47	10.20	8	53	.000	1.7

Table 3.11: Model Summary for Hierarchical Linear Regression - Schizotypy (Dependent Variable), Attachment Styles and Interpersonal Functioning.

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIP**
Model 1							
(Constant)	11.27	9.17		1.23	.22		
Attachment-Secure	-.77	1.10	-.10	-.70	.49	.57	1.7
Insecure-Fearful	1.90	1.04	.26	1.82	.07	.64	1.58
Insecure-Dismissing	1.64	.90	.23	1.82	.07	.80	1.25
Insecure-Preoccupied	1.30	1.07	.15	1.22	.23	.89	1.13
Model 2							
(Constant)	-10.02	6.76		-1.48	.14		
Attachment-Secure	.93	.83	.13	1.13	.27	.46	2.16
Insecure-Fearful	1.26	.76	.17	1.66	.10	.54	1.85
Insecure-Dismissing	.47	.66	.07	.71	.48	.60	1.66
Insecure-Preoccupied	.95	.87	.11	1.09	.28	.68	1.47
Hard to be Sociable	-.06	.63	-.01	-.090	.93	.26	3.8
Hard to be Assertive	1.29	.61	.35	2.11	.03	.21	4.72
Too Aggressive	.58	.63	.10	.91	.37	.50	2.01
Too Open	-.19	.82	-.03	-.24	.84	.31	3.22
Too Caring	-1.3	.67	-.25	-1.98	.05	.37	2.70
Hard to be Supportive	1.7	.51	.52	3.34	.00	.24	4.20
Hard to be Involved	.08	.55	.02	.14	.89	.24	4.24
Too Dependent	1.7	.51	.39	3.39	.01	.43	2.30

Table 3.12: Table of Coefficients for Hierarchical Linear Regression - Schizotypy (Dependent Variable), Attachment Styles and Interpersonal Functioning.

A further hierarchical linear regression was computed that only included the significant predictors of '*SPQ'* for model two. '*SPQ'* was entered as the dependent variable and '*Hard to be Assertive*', '*Hard to be Supportive*', and '*Too Dependent*' were entered into predictor block one. The Durbin-Watson value for this model was 1.6 and all VIF scores were significantly less than 10. These scores suggest that the assumptions of independence of residuals and linearity were not violated in this model. The variance accounted for in '*SPQ*' by variables '*Hard to be Assertive*', '*Hard to be Supportive*', and '*Too Dependent*' was 63% (Adjusted $R^2 = 0.63$, F (df: 3, 62) = 39.34, $p < .01$). This information is displayed in table 3.13. The data in the table of coefficients, displayed in table

3.14, indicates that '*Hard to be Supportive*' (t (3, 62) = 5.2, β =.41 ; p < 0.01) and '*Hard to be Assertive*' (t (3, 62) = 5.1, β = .43 ; p < 0.01) were making a broadly similar contribution to '*SPQ*'. *'Too Dependent'* was indicated to have made the least contribution to '*SPQ'* (t (3, 62) = 3.6; β = .29, p < 0.01).

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.81	.65	.63	8.97	1.6

Table 3.13: Model Summary for Hierarchical Linear Regression - Schizotypy (Dependent Variable) and predictors '*Hard to be Assertive*', '*Hard to be Supportive*' and '*Too Dependent*'.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Model 1 (Constant)	.18	3.00		.06	.95
Hard to be Assertive	1.6	.31	.43	5.1	.00
Hard to be Supportive	1.4	.26	.41	5.2	.00
Too Dependent	1.3	.36	.29	3.6	.00

Table 3.14: Table of Coefficients for Hierarchical Linear Regression - Schizotypy (Dependent Variable) and predictors '*Hard to be Assertive*', '*Hard to be Supportive*' and '*Too Dependent*'.

3.5.5 Primary Hypothesis: Summary

In model one ('*Attachment Style'*) none of the four individual attachment styles alone predicted '*SPQ*'. However, both *'Insecure-Fearful*' and '*Insecure-Dismissing*' attachment styles were only marginally insignificant as predictors of '*SPQ*'. In model one attachment styles collectively accounted for 18% of the variance in '*SPQ'*. The inclusion of IIP-32 in model two ('*Attachment Styles*' and IIP-32) significantly improved the predictive efficacy of the model. The final regression equation for model two accounted for 63% of the variance in '*SPQ*'.

3.6.1 Secondary Hypothesis

The secondary hypothesis of the current study is that levels of schizotypy will be predicted by depression. It is further hypothesised that depression will add significantly to the variance explained in schizotypy in a predictor model that includes variables of attachment style and interpersonal functioning. The secondary hypothesis will be tested using hierarchical linear regressions.

3.6.2 Secondary Hypothesis: Schizotypy and Depression - Correlational Analysis

As noted in 3.2.2 a significant correlation was observed between '*SPQ Total'* and '*BDI-II*' ($r = .63$, $p < 0.01$). Further correlations were computed to investigate the relationship between the domain factors of the SPQ and '*BDI-II*'. The results of these correlations indicated that the '*BDI-II*' was strongly correlated with each domain factor of the SPQ and each of the nine sub-scales of the SPQ. The results of these correlations are displayed in Table 3.15.

	Cognitive-Perceptual				**Interpersonal**			**Disorganised**	
BDI-II	**.63****				.51**			**.49****	
	Ideas of Ref	**Odd beliefs**	**Unusual Per**	**Suspicio usness**	**Social Anxiety**	**No friends**	**Constricted affect**	**Odd Behaviour**	**Odd Speech**
BDI-II	**.47****	**.36****	**.66****	**.41****	**.41****	**.45****	**.41****	**.40****	**.43****

Table 3.15: Table of Correlations for '*BDI-II*', SPQ Domain Factors and SPQ Sub-Scales.

Summary: All domain factors and sub-scales of the SPQ were positively correlated with '*BDI-II Total*'.

3.6.3 Secondary Hypothesis: Schizotypy, Attachment Style, Interpersonal Functioning and Depression[34]

A hierarchical linear regression was computed to investigate the association between schizotypy, attachment styles, interpersonal functioning and depression. *'SPQ'* was entered as the dependent variable and '*Attachment Styles',* (*'Attachment-Secure', 'Insecure-Fearful', 'Insecure-Dismissing' and 'Insecure-Preoccupied')* were entered into predictor block one; IIP-32 ('*Hard to be Social*', '*Hard to be Assertive*', '*Too Aggressive*', '*Too Open*', '*Too Caring*', '*Hard to be Supportive*', '*Hard to be Involved*' and '*Too Dependent*') were entered into predictor block two and '*BDI-II*' into predictor block three. The Durbin-Watson value for this model was 1.6 and all VIF scores were significantly below 10. On the basis of these scores it is unlikely that the assumptions regarding residual of error or linearity have been contravened in this model.

The hierarchical regression analysis indicated that the variance accounted for in '*SPQ'*, by '*Attachment Styles*', IIP-32 and '*BDI-II*' was 70% (Adjusted R^2 = .70, F (df: 13, 52) = 12.8 , $p < .01$). These data indicate that the variance that was accounted for in '*SPQ*' increased when *'BDI-II'* was added to a model that contained '*Attachment Styles*' and IIP-32 as predictor variables. The addition of a variable '*BDI-II*' in block three accounted for an extra 7% of variance (R Square change = 0.7, F change = 14.52, df: (1,52), p < 0.01) in '*SPQ*'. This information is displayed in table 3.16. The table of coefficients indicates that '*Too Caring'* (t (52) = -2.15, β = -.24, p <.05, '*Hard to be Supportive*' (t (52) = 2.86, β = .41, p <.01), '*Too Dependent'* (t (52) = 2.96, β = *0.31*. p <.01) and '*BDI-II*' t(52)=3.77, β=.32, p<.01 are significant predictors of '*SPQ*'. The β values for '*Too Dependent'* and *'BDI-II'* indicate that they are making broadly similar contributions to the model. *'Too Caring'* is making the least contribution to the model and '*Hard to be Supportive*' making the most significant contribution to the model. '*Insecure-Preoccupied'* (t (52) = 3.8), has a p value of p = .07 indicating that this was bordering on being a significant contributor to the model. However, the coefficient for this value is minor. The coefficients and t-values for this regression model are displayed in table 3.17.

[34] Appendix XIV contains Table of Correlations for BDI-II and Sub-Scales of IIP-32.

					Change Statistics					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin-Watson**
1	.48	.23	.18	13.41	.23	4.55	4	61	.00	
2	.84	.70	.63	9.02	.47	10.20	8	53	.00	
3	.87	.76	.70	8.07	.07	14.52	1	52	.00	1.6

Table 3.16: Model Summary for Hierarchical Linear Regression - Schizotypy (Dependent Variable), Attachment Style, Interpersonal Functioning and Depression.

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
Constant	11.27	9.17		1.23	.22		
Attachment-Secure	-.774	1.10	-.104	-.702	.49	.57	1.78
Insecure-Fearful	1.896	1.04	.26	1.82	.07	.64	1.58
Insecure-Dismissing	1.640	.90	.23	1.82	.07	.80	1.25
Insecure-Preoccupied	1.299	1.07	.15	1.22	.21	.89	1.13
(Constant)	-10.016	6.76		-1.48	.14		
Attachment-Secure	.929	.83	.13	1.13	.27	.46	2.16
Insecure-Fearful	1.256	.76	.17	1.6	.10	.54	1.85
Insecure-Preoccupied	.949	.87	.11	1.09	.28	.60	1.66
Insecure-Dismissing	.470	.66	.07	.712	.480	.68	1.47
Hard to Sociable	-.056	.63	-.01	-.090	.92	.26	3.84
Hard to be Assertive	1.285	.61	.35	2.11	.04	.21	4.72
Too Aggressive	.579	.63	.01	.913	.37	.50	2.01
Too Open	-.194	.82	-.03	-.24	.81	.31	3.22
Too Caring	-1.333	.67	-.25	-1.20	.05	.37	2.70
Hard to be Supportive	1.708	.51	.52	3.34	.00	.24	4.20
Hard to be Involved	.077	.55	.02	.14	.89	.24	4.24
Too Dependent	1.723	.51	.39	3.39	.00	.43	2.30
(Constant)	-13.46	6.12		-2.2	.03		
Attachment-Secure	.71	.74	.10	.96	.34	.46	2.18
Insecure-Fearful	1.16	.68	.16	1.71	.09	.54	1.9
Insecure-Preoccupied	1.47	.79	.16	1.85	.07	.59	1.7
Insecure-Dismissing	.43	.60	.06	.73	.47	.68	1.47
Hard to Sociable	.07	.56	.02	.12	.90	.26	3.85
Hard to be Assertive	.91	.55	.25	1.64	.11	.21	4.88
Too Aggressive	.34	.57	.06	.60	.55	.49	2.03
Too Open	.15	.74	.03	.20	.84	.31	3.27
Too Caring	-1.29	.60	-.24	-2.15	.04	.37	2.70
Hard to be Supportive	1.34	.47	.41	2.86	.006	.23	4.39
Hard to be Involved	-.01	.505	-.00	-.01	.10	.24	4.25
Too Dependent	1.38	.46	.31	2.96	.005	.42	2.40
BDI-II	.40	.11	.32	3.77	.000	.65	1.55

Table 3.17: Table of Coefficients for Hierarchical Linear Regression - Schizotypy (Dependent Variable), Attachment Style, Interpersonal Functioning and Depression.

A final hierarchical linear regression was computed that only included the significant predictors of '*SPQ*' in model three ('*Attachment Style'*, IIP-32 and '*BDI-II*'). '*SPQ'* was entered as the dependent variable; '*Too Caring*', '*Hard to be Supportive*' and '*Too Dependent*' were entered into

predictor block one and '*BDI-II*' was entered into predictor block two. The Durbin-Watson value for this model was 1.6 and all VIF scores were significantly less than 10. These scores suggest that the assumptions of independence of residuals and linearity were not compromised in this model.

In this model the variance accounted for in '*SPQ*' by variables '*Too Caring*', '*Hard to be Supportive*', '*Too Dependent*' and '*BDI-II*' was 61% (Adjusted $R^2 = 0.61$, F (df: 4, 61) = 25.98, $p < .01$). In this model the addition of variable '*BDI-II*' to a model that contained the significant predictors from IIP-32, namely variables '*Too Caring*', '*Hard to be Supportive*' and '*Too Dependent*', significantly increased the variance explained in '*SPQ*', accounting for an extra 11% of variance (R Square change = .11, F change = 18.12, df: (1, 61), $p < 0.01$) in *'SPQ'*. This information is displayed in table 3.18. The data in the table of coefficients, displayed in table 3.19, indicates that '*Hard to be Supportive*' (t (4, 61) = 5.01, $\beta = .45$; $p < 0.01$) made the most significant contribution to the model. '*BDI-II*' (t (4, 61) = 4.26, $\beta = .38$; $p < 0.01$) and '*Too Dependent*' (t (4, 61) = 4.18, $\beta = .45$; $p < 0.01$) were indicated to have made broadly similar contributions to the model. *'Too Caring'* (t (4, 61) = - 1.75 ; $\beta = - 1.9$, $p > 0.05$) was no longer a significant predictor of '*SPQ'* in this model.

					Change Statistics					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin-Watson**
1	.72	.52	.50	10.49	.52	22.41	3	62	.00	
2	.79	.63	.61	9.29	.11	18.12	1	61	.00	1.6

Table 3.18: Model Summary for Hierarchical Linear Regression – Schizotypy (Dependent Variable) and significant predictors '*Too Caring*', '*Hard to be Supportive*', '*Too Dependent*' and '*BDI-II*'.

	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
Constant	7.46	3.30		2.26	.03		
Too Caring	-1.03	.67	-.190	-1.54	.13	.51	1.96
Hard to be Supportive	1.94	.310	.59	6.25	.00	.88	1.14
Too Dependent	2.45	.520	.55	4.70	.00	.56	1.79
(Constant)	1.57	3.23		.48	.63		
Too Caring	-1.03	.59	-.19	-1.75	.09	.51	1.96
Hard to be Supportive	1.48	.30	.45	5.01	.00	.76	1.32
Too Dependent	1.979	.474	.45	4.18	.00	.53	1.89
BDI-II	.477	.112	.38	4.26	.00	.77	1.29

Table 3.19: Table of Coefficients for Hierarchical Linear Regression - Schizotypy (Dependent Variable) and significant predictors '*Too Caring*', '*Hard to be Supportive*', '*Too Dependent*' and' *BDI-II'*.

3.6.4 Secondary Hypothesis: - Summary

The final regression equation for model three (‘*Attachment Style’*, IIP-32 and ‘*BDI-II*’) accounted for 63% of the variance in ‘*SPQ*’. In this model the inclusion of variable ‘*BDI-II*’ added significantly to the variance accounted for in ‘*SPQ*’

3.7.1 Further Analysis: Mediation Path Models[35]

In order to test hypothesised direct and indirect effects structural equation modelling (SEM) was utilised using EQS version 6.1 (Bentler, 2010). Goodness of fit of all models was evaluated using the Satorra-Bentler robust fit statistics: The Satorra-Bentler $\chi 2$ (S-B $\chi 2$) and the Robust Comparative Fit Index (RCFI: Bentler, 1998). Satorra-Bentler developed the S-B chi-square statistic, which incorporates a scaling correction for the chi-square statistic when distributional assumptions are violated. This method includes a number of scaling corrections aimed to improve the chi-square approximation of goodness-of- fit test statistics in small samples, large models, and non normal data. EQS and MPlus offer the S-B Chi square and 'robust' fit indices for small and non normal data sets (Satorra A & Bentler PM (2001). In path analyses using structural equation modelling techniques sample size is extremely difficult to figure out a priori by using exact equations since we don't have the necessary information about the strength of the relationships among the variables. Bentler and Chou (1987) and Chin and Newsted (1999) suggest a standard of 1:10 or as low as 1:5 subjects per parameter; each measured variable usually has three parameters: its path coefficient, its variance, and the disturbance term. Bentler and colleagues argue that a ratio of 1:5 can be employed when appropriate model corrections are used and there are few latent variables in a model.

The chi-square is the most commonly used measure of model fit and assesses the model's "*badness of fit*" - a high chi-square value with a significant p value suggests a poor fit of the model to the data. The RCFI ranges from 0 to 1 with values greater than 0.90 indicating a good fit. The Root Mean Square of Approximation (RMSEA: Browne and Cudeck, 1993) is a measure of fit that takes into account a model's complexity where a RMSEA of 0.05 or less indicates a good model fit. Covariance SEM was utilised to examine the goodness of fit of two a priori models relating '*SPQ'* to the predictor variables: '*Attachment*', '*IIP-32*', and '*BDI-11'*. For all path models direct and mediating effects of the main hypothesised mediating factors were systematically tested.

Two mediation path models were computed to investigate any mediating and indirect associations between the main variables of the current study. The relative fit of the two

[35] My academic supervisor Dr. Matthias Schwannauer computed the path model analysis.

models are compared using a variety of fit indices. Nested models can be compared statistically using the Satorra-Bentler method of scaled difference between two nested models based on the chi square statistic of model fit (Satorra & Bentler, 2001). The Satorra-Bentler scaled difference of the models = 33.24, df = 2, Chi square probability = 0.001. Based on the Satorra Bentler and normal chi square of the two models, the two models are significantly different. Model two therefore provides a significant improvement of model fit.

The first path model included variables '*SPQ', 'Attachment', 'IIP-32' and 'BDI-II'*. This path analysis hypothesised a simple mediation model to test for the mediating effect of the indirect associations over the direct path. Overall this model did not ideally fit the data, but provided a fair approximation (S-B $\chi 2$ = 131.48 (p = 0.001); RCFI = .89; RMSEA = 0.08). The results indicated that the association between *'Attachment'* and *'SPQ'* was partially mediated by both '*IIP-32'* and *'BDI-II'*. There was a weak direct association between *'Attachment'* and *'SPQ'* but this association was strengthened significantly when it was mediated by either '*IIP-32*' or '*BDI-II*'. This information is illustrated visually in figure 3.2.

The second path model analysis model included variables '*SPQ', 'Attachment', 'IIP-32*' and *'BDI-II'*. The model fits the data well and was a better fit to the data than model one (S-B $\chi 2$ = 13.81 (p = 0.091); RCFI = .91; RMSEA = 0.05). All direct and indirect paths were included in this analysis. The results indicated a weak direct association between '*Attachment*' and '*SPQ*'. Similar to model one, this association was significantly strengthened when mediated by '*IIP-32*'. Of significance, the mediating effect of '*BDI-II*' on the association between '*Attachment'* and *'SPQ'* that was observed in the first path model was non-significant in the second path model. The latter finding suggests that variable '*BDI-II*' has a minimal non-significant mediating role in the association between '*Attachment'* and variable *'SPQ'* except in the capacity of mediating the impact of '*IIP-32'* on *'SPQ'*. Overall the findings of the second path model analysis indicate that the most significant predictor of variable '*SPQ'* is understood in the context of a mediating relationship that exists between variable '*Attachment*' and '*IIP-32*', and the mediating effect of IIP-32 on '*SPQ*' through BDI-II'. This information is illustrated visually in figure 3.3. The broken arrow in this diagram indicates that the association between Attachment and '*BDI-II*' is non-significant.

Figure 3.2: Mediation Path Model 1.

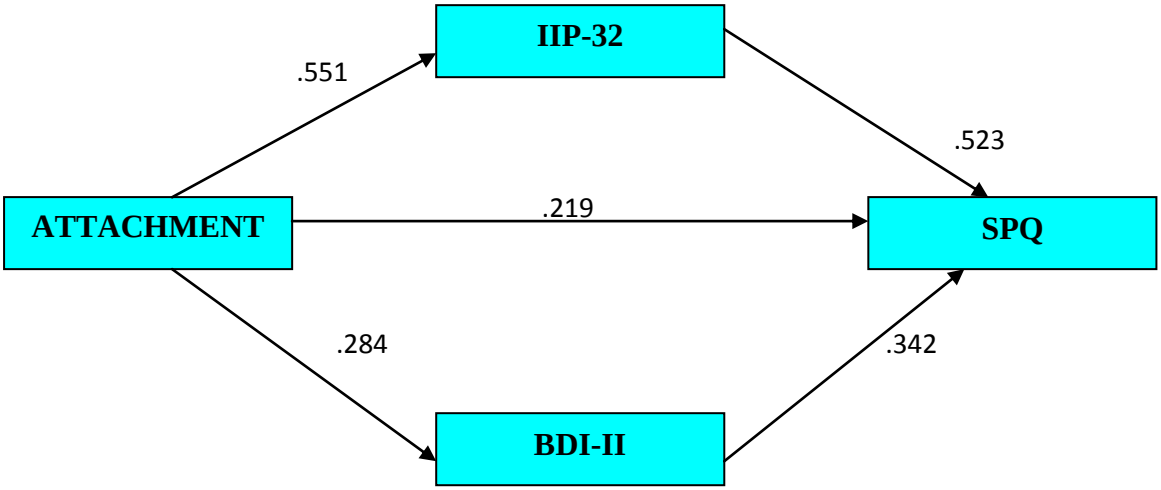
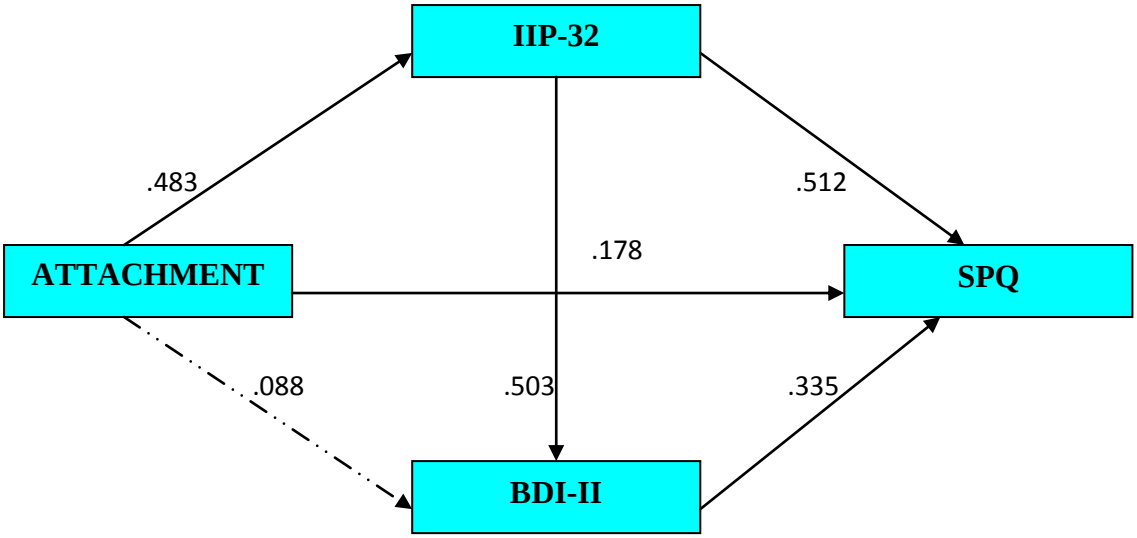


Figure 3.3: Mediation Path Model 2.



3.7.2 Summary: Path Analysis

In a model with '*SPQ*', '*Attachment*', '*IIP-32'* and '*BDI-II'*, where the mediating effect of the indirect associations over the direct path was tested, the strongest association observed between '*Attachment*' and '*SPQ*' occurred when this association was mediated by either '*IIP-32*' or '*BDI II*'. In a model with '*SPQ*', '*Attachment*', '*IIP-32*' and '*BDI-II*', where all direct and indirect paths were included in the analysis, the significant mediating relationship was between '*Attachment*','*IIP-32*' and '*SPQ*', with '*BDI-II*' mediating the impact of '*IIP-32*' on '*SPQ*'.

CHAPTER FOUR - DISCUSSION

4.1.1 Overview of Discussion Chapter

The following chapter will provide a summary of the main findings of the study. To provide clarity, the findings in regard to the primary hypothesis and the secondary hypothesis will be discussed separately. Next, the findings of the current study will be discussed in relation to research and the potential theoretical implications of these findings to current psychological theory. Finally, the strengths and weaknesses of the research design of the current study and recommendations for future research will be discussed.

4.2.1 Primary Hypothesis

'*The primary hypothesis of the current study is that level of schizotypy will be predicted by attachment style and interpersonal functioning. It is hypothesised that the inclusion of variable interpersonal functioning to a predictor model that contains variable attachment style will add significantly to the variance explained in variable schizotypy. The predictive association between these psychological variables will be tested using hierarchical linear regressions*'.

4.2.2 Findings: Primary Hypothesis

The first component of the primary hypothesis predicted that schizotypy would be predicted by attachment style. The findings of the current study provided tentative support for this aspect of the primary hypothesis. Firstly, the correlational analysis indicated a negative correlation between schizotypy and '*Attachment-Secure*' style and a positive correlation between schizotypy and both '*Insecure-Fearful*' and '*Insecure-Dismissing*' attachment styles. Of note, no significant association was observed between schizotypy and '*Insecure-Preoccupied*' attachment style. The reason regarding why this association was not observed is unclear. However, failure to detect this association does not appear to be related to either the distribution of the data for this variable or because the sample was underpowered. In regard to the distribution of data for this variable, the

skewness and kurtosis scores for this variable were noted to be within the normal parameters required for parametric statistics. In relation to the power of the study, the frequency statistics indicated that only seven participants in the sample identified '*Insecure-Preoccupied*' as their overall attachment style. However, the likert scores from section two of the '*Relationship Questionnaire'* were used as the data to investigate the hypotheses of the current study. Therefore, a score for each of the four attachment styles was used for each participant. On this basis, it is unlikely that the failure to observe a significant association between schizotypy and '*Insecure-Preoccupied*' can be understood in the context of either the distribution of this variable or as a consequence of an underpowered sample.

The associations observed between first order schizotypal dimensions and attachment styles in the current study were exclusive to the '*Interpersonal*' domain factor. However, there were limited associations observed between attachment styles and second order schizotypal[36] dimensions in domain factor *'Cognitive-Perceptual'* and domain factor '*Disorganised*'. Firstly, in domain factor *'Cognitive-Perceptual',* a negative association was observed between '*Attachment-Secur*e' and '*Odd Beliefs*', and between '*Attachment-Secur*e' and '*Suspiciousness*'. A positive association was observed between '*Insecure-Fearful*' and '*Suspiciousness'*; and '*Insecure-Dismissing*' and '*Unusual Perceptual Experiences*'. In domain '*Disorganised*', second order schizotypal dimension associations were observed between '*Insecure-Dismissing'* and '*Odd Behavior*'; and between '*Insecure-Preoccupied*' and '*Odd Speech*'.

The ancillary aspect of the primary hypothesis was that schizotypy would be predicted by interpersonal functioning. The findings of the current study are consistent with this aspect of the primary hypothesis. In support of this conclusion, the correlational analysis that was computed to investigate the association between schizotypy and interpersonal functioning indicated that those with high levels of schizotypy were likely to have poor interpersonal functioning.

The positive association between schizotypy and interpersonal functioning was observed for both first and second order schizotypal dimensions. In regard to first order schizotypal

[36] Associations between attachment styles and second order schizotypal dimensions in domain '*Interpersonal*' were also observed.

dimensions, strong positive associations were observed between '*Cognitive-Perceptual*', '*Interpersonal*' and '*Disorganised*' to overall level of interpersonal functioning, whereby high levels of schizotypy were associated with poor interpersonal functioning. Furthermore, the findings indicated a positive association between all of the first order schizotypal dimensions to each of the eight interpersonal functioning styles, with the exception that no association was observed between '*Interpersonal'* domain to either interpersonal functioning style *'Too Aggressive'* or *'Too Caring'*. Significant positive associations were also observed between second order schizotypal dimensions and the eight interpersonal functioning styles. Of note, all second order schizotypal dimensions were positively associated with '*Hard to be Assertive*' and '*Hard to be Supportive*' interpersonal functioning styles. '*Hard to be Involved*' was positively associated with all second order schizotypal dimensions with the exception of '*Odd Beliefs*'. Of the remaining five interpersonal styles, '*Too Dependent*', '*Too Open*' and '*Hard to be Social*' were positively associated to all but two of the second order schizotypal dimensions[37]. The remaining two interpersonal functioning styles, namely '*Too Aggressive*' and '*Too Caring*' were positively associated with five of the nine second order schizotypal dimensions[38].

The results of the hierarchical linear regression that investigated the association between predictor variables attachment styles and interpersonal functioning to schizotypy supported the primary hypothesis. Firstly, the findings indicated that both attachment styles and interpersonal functioning were predictors of schizotypy. Attachment styles alone were observed to be a poor-moderate predictor of schizotypy. In this regard, although attachment styles collectively accounted for 18% of the variance in schizotypy

[37] '*Too Dependent*' was positively associated with all second order effects with the exception of '*No Close Friends'* or '*Constricted Affect*'; '*Too Open*' was positively associated with all second order effects with the exception of '*Ideas of Reference*' and '*Social Anxiety*; *'Hard to be Social*' was positively associated with all second order effects with the exception of '*Odd Beliefs*' and '*Odd Behaviour'*

[38] '*Too Aggressive*' was positively associated with all second order effects with the exception of '*No Close Friends*', '*Constricted Affect*', '*Odd Beliefs*' and '*Unusual Perceptual Experiences*'. Likewise, '*Too Caring*' was positively associated with all second order effects with the exception of '*Social Anxiety*', '*No close Friends*', '*Constricted Affect*' and '*Odd Speech'*.

none of the four individual attachment styles alone predicted schizotypy. A predictor model that included both attachment styles and interpersonal functioning accounted for sixty three per cent of the variance in schizotypy. The inclusion of interpersonal functioning to a model that included attachment style, significantly improved the predictive power of the model accounting for approximately an additional forty five per cent of variance in schizotypy. The main contributor to this model was interpersonal functioning ('*Hard to be Assertive',* '*Hard to be Supportive*' and *'Too* Dependent'). Overall these findings provide moderate support for the primary hypothesis of the current study.

4.3.1 Secondary Hypothesis

'*The secondary hypothesis of the current study is that level of schizotypy will be predicted by depression. It was further hypothesised that depression will add significantly to the variance explained in schizotypy in a predictor model that includes variables of attachment style and interpersonal functioning. The secondary hypothesis will be tested using hierarchical linear regressions.*'

4.3.2 Findings: Secondary Hypothesis

The first component of the secondary hypothesis predicted that levels of schizotypy would be predicted by depression. The correlational analysis completed in the current study indicated there was a positive association between overall levels of schizotypy and overall levels of depression. Furthermore, this association was observed between overall level of depression and all first order and second order schizotypal dimensions.

The second component of the secondary hypothesis predicted that the inclusion of depression would add significantly to a predictor model that included variables attachment styles and interpersonal functioning. The predictive association between attachment, interpersonal functioning and depression to variable schizotypy was tested both linearly, using hierarchical regression analysis and non-linearly using path analysis.

The findings of the hierarchical linear analysis indicated that the final regression equation for the significant predictors of schizotypy in model three accounted for a total of sixty three per cent of the variance in schizotypy. In this model the inclusion of depression

improved the predictive efficacy of the model, accounting for an additional eleven per cent of variance in schizotypy. The main contributors to this model were interpersonal functioning ('*Hard to be Supportive*', and '*Too Dependent*') and Depression ('*BDI-II*'). This finding provides modest support for hypothesis two.

Two path analysis models were computed to investigate the non-linear analysis associations between schizotypy, attachment, interpersonal functioning and depression. The first path analysis hypothesised a simple mediation model to test for the mediating effect of the indirect associations over the direct path. The overall fit for this model was moderate. The results of this model indicated that there was a weak direct association between attachment and schizotypy. This association was strengthened significantly when it was mediated by either interpersonal functioning or depression. This finding was broadly similar to the findings of linear hierarchical regression that investigated the predictive associations between these variables.

In the second path model, all direct and indirect paths between variables were included in the analysis. The results indicated that the data fit for this model was good and superior to that for the first path model. The results indicated a weak direct association between attachment styles and schizotypy. This association was significantly strengthened when mediated by interpersonal functioning. The results for this model indicated that the mediating relationship observed in the first path model between attachment, depression and schizotypy was no longer significant. In this model, depression mediated the impact of interpersonal functioning on schizotypy. The significant finding in regard to path model two was that the best predictor of schizotypy was understood in the context of a mediating relationship between attachment, interpersonal functioning and schizotypy, whereby depression mediates the impact of interpersonal functioning on schizotypy. This should be considered as the core clinical finding of the current study. This finding of the current study may be considered consistent with a stress-diathesis model of schizophrenia whereby predictors of schizotypy/schizophrenia are best understood in the context of an interaction between developmental vulnerability factors (attachment styles) and current stressors (level of interpersonal functioning).

4.4.1 Previous Research

In this section of the discussion, the findings of the current study will be compared to previous research that has investigated the association between attachment and schizotypy. At the time of the thesis proposal the Chief Investigator could only identify three studies that investigated this association in the previous fifteen years, namely those completed by Berry *et al*. (2006), Meins *et al*., (2008) and Tiliopoulos & Goodall (2009). The findings of the current study will be examined separately to each of these studies. Of these studies, only one study (Berry *et al.,* 2006) included a state measure of interpersonal functioning and none included a measure of depression or used non-linear analysis to investigate the association between attachment and schizotypy. As a consequence, the extent to which meaningful comparisons can be made between the core clinical finding of the current study to previous research literature is limited. Therefore, further to a discussion comparing the findings of the current study to the aforementioned studies, the core clinical finding of the current study will be discussed within a broader remit to research that has investigated the association between attachment and interpersonal functioning to other psychopathologies.

Berry *et al.* (2006) investigated the validity of the *'Psychosis Attachment Measure'* (PAM) and the association between attachment styles, interpersonal functioning and sub-clinical psychotic phenomena in a student sample. The findings of the Berry *et al.,* (2006) study indicated that '*Attachment Anxiety*' and '*Attachment Avoidance*' were positively associated with '*Social Anhedonia', 'Paranoia'* and '*Hallucination-Proneness'*[39]. Direct comparison between the current study and the Berry *et al.,* (2006) study is limited on account of the discrepancies that exist between the studies in regard to how attachment styles were conceptualised and measured. In the Berry *et al*., (2006) study, attachment styles were classified using '*Attachment Anxiety*' and '*Attachment Avoidance*' criteria. The current study classified participant attachment styles as either '*Attachment-Secure*', '*Insecure-Fearful*', '*Insecure-Dismissing*' or *'Insecure-Preoccupied*'. However, this discrepancy is unlikely to compromise the comparison that can be made between findings

[39] The association between '*Hallucination-Proneness'* and '*Attachment Avoidance*' was no longer significant in this study when the effects of affect were controlled.

since both have measured the same construct, differing only slightly in regard to how it was conceptualised[40].

The association reported in the Berry *et al*., (2006) study between attachment and '*Social Anheodia*'[41] was partially replicated in the current study. The findings of the current study indicated: a positive association between domain factor '*Interpersonal*' to '*Insecure-Fearful*' and '*Insecure-Dismissing*' attachment styles and: a negative association between domain factor '*Interpersonal*' and '*Attachment-Secure*'. There was partial support for the positive association reported in the Berry *et al*., (2006) study between '*Attachment Anxiety*', '*Attachment Avoidance'* and '*Paranoia*'. The findings of the current study indicated a negative association between '*Secure-Attachment*' style and '*Suspiciousness,*' and a positive association between '*Insecure-Fearful*' attachment style and '*Suspiciousness*'. There was less support in the current study for the positive association reported in the Berry *et al*., (2006) study between '*Attachment Anxiety*', '*Attachment Avoidance*' and '*Hallucination-Proneness*'. In this regard, the findings of the current study indicated that *'Insecure-Dismissing*' attachment style was the only attachment style that was positively associated with '*Unusual Perceptual Experiences*'.

Overall, the findings of the current study partially replicated the association reported between insecure attachment styles to '*Social Anhedonia'*, '*Paranoia*' and '*Perceptual Aberrations*' in the Berry *et al.,* (2006) study. The associations observed between insecure attachment to both '*Paranoia*' and '*Perceptual Aberrations*' were more pronounced in the Berry *et al*., (2006) study than the corresponding associations in the current study. This discrepancy is likely to be related to the differences in regard to the measures that were used to assess these schizotypal dimensions. As noted in 1.6.1, the Berry *et al.,* (2006) study used the 20 item Paranoia Scale – (PS: Fenigstein & Vanable, 1992) to assess for paranoid ideation. Likewise, the Launay-Slade Hallucinations Scale (LSHS; Launay & Slade, 1981) was used in the Berry *et al.,* (2006) to assess sub-clinical hallucinatory experiences. It is likely these measures were significantly more sensitive at

[40] This point applies equally when comparing the results of the Meins *et al*., (2008) study and the Tiliopoulos & Goodall (2009) study[40]. These studies also conceptualised attachment styles according to '*Attachment Anxiety*' and '*Attachment Avoidance*' criteria.
[41] Variable '*Social Anhedonia*' was used to assess the '*Interpersonal*' domain factor of schizotypy in the Berry *et al.,* (2006) study.

detecting symptoms of paranoid ideation and perceptual aberrations than the Schizotypal Personality Questionnaire (Raine, 1991) which was used in the current study.

The findings of the Berry *et al.,* (2006) study indicated an association between both *'Attachment Anxiety'* and *'Attachment Avoidance'* to overall level of interpersonal functioning as assessed by the IIP-32 (Barkham *et al.,* 1996). The exploratory analysis that was computed in the current study indicated that attachment style: '*Secure-Attachment*' was negatively correlated with overall interpersonal functioning[42] and: '*Insecure-Fearful*' and '*Insecure-Dismissing*' were positively correlated with overall interpersonal functioning. No association was observed between '*Insecure-Preoccupied*' and overall level of interpersonal functioning in the current study. Furthermore, significant associations were observed in the current study between each individual attachment styles and the interpersonal styles of the IIP-32. Overall the findings of the current study are broadly similar to the associations reported between attachment style and interpersonal functioning in the Berry *et al.,* (2006) study.

Meins *et al*. (2008) investigated the association between peer attachment dimensions and parental bonding in regard to schizotypic traits in a non-clinical student sample. This study was cross-sectional and used linear regressions statistical methods to investigate the hypotheses. The core findings of the Meins *et al*., (2008) study indicated that '*Attachment Anxiety*' and '*Attachment Avoidance*' predicted SPQ total score and each individual negative schizotypal sub-scale ('*Social Anxiety', 'No Close Friends*' and '*Constricted Affect*'). Furthermore, a predictive association was observed between '*Attachment Anxiety*' and '*Suspiciousness*'[43].

The main finding of the Meins *et al*., (2008) study indicated that overall level of schizotypy was predicted by both '*Attachment Anxiety*' and '*Attachment Avoidance*'. The findings of the current study replicated this finding. In support, the results of the current study indicated the following. Firstly, schizotypy alone was a poor-moderate solo predictor of overall level of schizotypy. Secondly, attachment style was a good-strong

[42] High scores on the IIP-32 indicate poor interpersonal functioning.
[43] Reported results relate to overall associations observed variables without the effects of the PBI being controlled for.

predictor of schizotypy in a predictor model that accounted for current level of interpersonal functioning and level of depression. The findings of current study provided tenative support for the predictive associations that were observed in the Meins *et al*., (2008) study between '*Attachment Anxiety*' and '*Attachment Avoidance*' to each of the individual negative schizotypal sub-scales of the SPQ. The current study did not investigate the predictive association between attachment styles and first order schizotypal dimensions. However, as noted above, the correlational analysis that was computed in the current study indicated: positive associations between domain factor '*Interpersonal*' to both '*Insecure-Fearful*' '*Insecure-Dismissing*' attachment styles; and a negative association between domain factor '*Interpersonal*' and '*Attachment-Secure'* attachment style.

The findings of the Meins *et al*., (2008) indicated a predictive association between '*Attachment Anxiety*' and '*Attachment Avoidance*' to second order dimension '*Suspiciousness*'. The findings of the current study indicated a broad association between insecure attachment style and '*Suspiciousness'*. In support of this assertion, the correlational analysis in the current study indicated a negative association between '*Secure-Attachment*' style and '*Suspiciousness*': and a positive association between '*Insecure-Fearful*' attachment style and '*Suspiciousness*'. Overall, the findings of the current study partially replicate the association between these variables reported in the Meins *et al*., (2008) study.

Tiliopoulos & Goodall (2009) investigated the relationship between adult attachment and schizotypal personality traits using a non-clinical sample. This study was cross-sectional and used bivariate and multivariate canonical correlations to investigate the association between attachment and schizotypy. The main findings of the Tiliopoulos & Goodall (2009) study indicated strong associations between insecure attachment styles to first and second order schizotypal dimensions.

In regard to first order schizotypal dimensions, the results of the Tiliopoulos & Goodall (2009) study indicated the following. Firstly, a positive association was observed between '*Attachment Avoidance*' to first order schizotypal domain factor '*Interpersonal*'. Secondly, a positive association was observed between '*Attachment Anxiety*' to first order schizotypal domain factors '*Interpersonal*', '*Disorganised*' and '*Cognitive-Perceptual*'.

The associations observed in the current study between attachment styles and first schizotypal domain factors only partially replicated these findings. Firstly, the findings of the current study indicated: a negative association between '*Secure-Attachment*' and first order domain factor '*Interpersonal*' and: a positive association between both '*Insecure-Fearful*' and '*Insecure-Dismissing*' attachment styles to first order domain factor '*Interpersonal*'. However, the associations observed in the Tiliopoulos & Goodall (2009) study between '*Attachment Anxiety*' to domain factors '*Disorganised*' and '*Cognitive-Perceptual*' were not observed in the current study. In this regard all associations observed between attachment styles and domain factors in the current study were exclusive to domain factor '*Interpersonal*'.

In regard, to second order schizotypal dimensions, the results of Tiliopoulos & Goodall (2009) study indicated the following associations. Firstly, '*Attachment Avoidance*' was associated with all second order factors in domain factor '*Interpersonal'*. Secondly, '*Attachment Anxiety'* was associated with all second order schizotypic dimensions within domains '*Interpersonal*', '*Disorganised*' and '*Cognitive-Perceptual*', with the exception of '*Magical Thinking'* and '*No Close Friends*'. The results of the current study only indicated limited support for these associations. In this regard, the findings of the current study did indicate support for the association between attachment styles and second order schizotypal associations in domain factor '*Interpersonal*'. In support of this assertion '*Insecure-Fearful*' style was positively correlated with all second factors in this domain; *'Secure-Attachment*' style was negatively correlated with all second factors in this domain; '*Insecure-Dismissing*' was positively correlated with sub-scales '*No Close Friends*' and '*Constricted Affect*' in this domain. However, the numerous associations observed in the Tiliopoulos & Goodall (2009) study between attachment styles and second order factors were not reproduced in the current study. In this regard, the only observed association in relation to second order factors in domain factor '*Cognitive-Perceptual*' was between '*Secure-Attachment*' and '*Odd Beliefs*'; and between '*Insecure-Dismissing*' and '*Unusual Perceptual Experiences*'. Likewise, the only second order domain factor associations observed in domain factor '*Disorganised*' were between '*Insecure-Dismissing'* and '*Odd Behavior*'; and '*Insecure-Preoccupied*' and '*Odd Speech*'. Overall, it may be concluded that the findings of the current study partially replicated the findings in the Tilipoulos & Goodall (2009) study.

The core clinical finding of the current study indicated that the best predictor of schizotypy was understood in the context of a mediating relationship between developmental factors, namely attachment style, and current level of interpersonal functioning. As noted, of the aforementioned studies only one study (Berry *et al.*, 2006) included a state measure of interpersonal functioning and none included a measure of depression or used non-linear analysis to investigate the association between attachment and schizotypy. As a consequence, the comparisons that can be made between the core clinical finding of the current study to previous research literature is limited. However tentative comparisons to previous research that has been completed in a broader research context that investigated the non-linear associations between attachment and interpersonal functioning to other psychopathologies is possible.

The Chief Investigator identified three studies that used non-linear analysis to investigate the association between attachment, interpersonal functioning and psychopathogy (Tasca *et al*., 2009; Wei *et al.*, 2005a; Wei *et al.*, 2005b). The overall finding of these studies indicated that a mediating relationship existed between attachment style, interpersonal functioning/affect regulation, and depression (Wei *et al.*, 2005a; Wei *et al.*, 2005b) and eating pathology (Tasca *et al*., 2009). In regard to depression, Wei (2005a) reported that the association between '*Attachment Anxiety*', '*Loneliness*' and subsequent depression was mediated by '*Social Self-Efficacy*'. Conversely, Wei (2005a) reported that '*Attachment Avoidance*', '*Loneliness*' and subsequent depression was mediated by '*Self-Disclosure*'. Wei *et al*. (2005b) investigated the association between affect regulation, attachment, negative mood (anxiety and depression) and interpersonal problems. The overall finding of that study indicated that distinct affect regulation strategies were associated with both '*Attachment Anxiety*' and '*Attachment Avoidance'* styles, and that these attachment styles mediated the association between interpersonal functioning and negative mood difficulties. Likewise, Tasca *et al*., (2009) reported a similar non-linear interaction between attachment, affect regulation strategies, depression and eating pathology (Tasca *et al.,* 2009). The core clinical finding of the current study is consistent with this research (Wei *et al.*, 2005a; Wei *et al.,* 2005b; Tasca *et al*., 2009) and further supports the important mediating role of interpersonal functioning in the relationship between attachment styles and psychopathology.

In conclusion, the findings of the current study broadly replicated previous research findings. Firstly, the positive associations observed between schizotypy and insecure attachment styles (with the exception of '*Insecure-Preoccupied*'): and negative association between schizotypy and secure attachment, were consistent with those reported in the research literature (Tiliopoulos & Goodall, 2009; Meins *et al*., 2008; Berry *et al*., 2006). Secondly, the results of the path analysis in the current study that indicated an association between attachment, interpersonal functioning and schizoptypy is consistent with research that has investigated these associations in other psychopathogies (Tasca *et al*., 2009; Wei *et al.,* 2005a; Wei *et al.,* 2005b). Finally, in a broader context the findings of the current study are consistent with both the significant research evidence indicating that attachment is a general diathesis for psychopathology (Ravitz, *et al.*, 2010) and that poor interpersonal functioning is a central feature of psychopathology (Aldao, *et al*., 2010).

4.5.1 Potential Implications of Findings

In this section of the discussion, the potential implications of the findings of the current study will be discussed in relation to psychological theory. The results of the current study have potential implications regarding the validity of the dimensional model of schizotypy/schizophrenia and the importance of attachment and interpersonal functioning within a stress diathesis model of schizotypy/schizophrenia.

The distribution of schizophrenic symptoms in the general population has important implications in regard to both the status of the psychosis phenotype as a dichotomous or as a continuous entity and the aetiology of the disorder (van Os, 2009). As noted in section 1.3.4, previous epidemiological studies have indicated that the distribution of symptoms of schizotypy/schizophrenia symptoms in the general population is most consistent with a continuous half normal population distribution (van Os, 2009). The descriptive statistics in the current study indicated that significant levels of schizotypal symptoms were prevalent in the sample. In support of this assertion the mean score on the SPQ questionnaire for the sample was twenty-eight. The current study did not use a general population sample, but did exclude participants with an acute psychotic disorder. Therefore, this finding should be considered consistent with the epidemiological literature that has indicated that incidences/prevalence of symptoms of schizotypy/schizophrenia exceed the incidence/prevalence of diagnoses of schizophrenia (van Os, 2009). On this basis the findings of the current study may be considered as providing further support for the hypothesis that schizophrenia exists as a dimensional entity in the general population.

The observed discrepancy between the general incidences of schizophrenia to incidences of symptoms of schizotypy/schizophrenia that was replicated in the current study has important implications in relation to the stress-vulnerability model of schizophrenia (Zubin & Spring, 1977). Firstly, it reaffirms previous epidemiological research that indicates that the significant majority of schizotypic symptoms are transitory and do not progress to a severity level that meets formal DSM-IV criteria for diagnosis/ or a requirement for long-term care (van, Os, 2009). Secondly, it further emphasises the need to enhance the scientific understanding into the factors and the precise causal

mechanisms that translate sub-clinical vulnerability for the disorder into incidences of clinical schizophrenia proper (Read, *et al.*, 2005).

The core clinical finding of the current study indicates a possible causal mechanism by which a vulnerability factor, namely attachment style, and current stress (level of interpersonal functioning) may act in unison to increase vulnerability to the disorder. As outlined in section 1.3.5, Berry *et al.*, (2007) made logical postulations regarding how attachment styles and their associated interpersonal functioning styles may increase vulnerability to/and maintain symptoms of schizophrenia. For example, from the conceptual viewpoint of attachment theory, an individual with an '*Attachment-Avoidance*' attachment style is likely to employ maladaptive interpersonal functioning strategies, namely social avoidance, a lack of trust in others and defensive self-sufficiency. It is hypothesized by Berry *et al.*, (2007) that these maladaptive interpersonal functioning strategies, particularly during periods of stress, increase vulnerability and may maintain the symptoms of schizophrenia. The hypotheses made by Berry *et al*., (2007) regarding the role of attachment factors in a stress-vulnerability model of schizophrenia are based on the premise that those at increased vulnerability for the disorder have difficulties in regard to interpersonal functioning. On the supposition that schizotpy is a sub-clinical form of schizophrenia, the overall finding of the current study should be considered as providing further support for the Berry *et al*., (2007) postulations regarding interpersonal functioning as an important vulnerability and maintaining factor for schizophrenia.

4.6.1 Strengths and Weaknesses of the Research Design of the Current Study

The robustness of the findings of the current study and the potential implications of these in relation to current psychological theory are dependent on the veracity of the research design. Therefore, in the next section the strengths and weaknesses of the research design of the current study will be examined in relation to the measures used, the statistical analysis employed and the sample used. Subsequent to this, the contribution of the current study to the psychological research literature will be evaluated.

The current study used the Schizotypal Personality Questionnaire (SPQ: Raine, 1991); the Relationship Questionnaire (RQ: Bartholomew & Horowitz, 1991); Inventory of Interpersonal Problems-32 (IIP-32: Barkham *et al.,* 1996) and the Beck Depression Inventory II (BDI-II: Beck *et al*., 1996). As noted in section 2.3, research evidence has consistently demonstrated that these questionnaires are accurate measures of the constructs they were designed to measure. A potential limitation of the current study relates to the measure used to assess attachment style. The priority of the Chief Investigator would have been to use to the Adult Attachment Interview (AAI) to assess attachment styles. However, it was not possible to use this assessment tool for the following two reasons. Firstly, the Chief Investigator had not completed the necessary training to conduct AAIs. Secondly, it would not have feasible to use the AAI regardless of whether the Chief Investigator had the appropriate training to facilitate this due to the time constraints on completing the study. Not using the AAI to assess attachment styles should not be considered as a significant limitation of the current study. In this regard, as noted the RQ (Bartholomew & Horowitz, 1991) is considered to be an accurate measure of adult attachment styles. Overall, on the basis of the research evidence reviewed in section 2.3, all measures used in the current study should be considered as adequate to assess the association between the variables investigated in the hypotheses.

The current study employed descriptive statistics, correlational analysis, hierarchical regression analysis and structural equation modeling to investigate the hypotheses. The use of descriptive statistics to obtain an overview of the distribution of scores for the main variables is non-controversial. Serial correlations are associated with the increased

probability of computing a type one error. However, the main hypotheses were tested using Hierarchical Linear Regression and structural equation modeling and correlational analysis was employed for exploratory purposes only. Hierarchical linear regressions, as opposed to the computation of multiple singular Linear regressions, were computed to increased the power of the study and to minimise the likelihood of a type one error in the regression analysis. Furthermore, it should be noted that none of the assumptions regarding the use of hierarchical linear regression analysis were violated in the current study. In regard to the use of structural equation modeling the Robust Comparative Fit Index (RCFI) and the Root Mean Square of Approximation (RMSA) scores indicated that the model fits for the path models were satisfactory. However, a potential limitation of the statistical analysis employed was that due to time constraints alternative path models that may have been of pertinence to the thesis hypotheses were not investigated. For example, it may have been of value to investigate whether schizotypy predicted level of depression or interpersonal functioning, or whether depression predicted attachment style and interpersonal functioning. Overall, the statistical analysis employed in the current study to investigate the hypotheses of the current study should be considered to be robust.

Evaluations regarding the sample that was used in the current study will be made in regard to the use of a clinical sample, potential bias regarding gender in the sample and the overall power of the sample. In regard to the use of a clinical sample, the current study differed from all previous studies which had used non-clinical samples. A clinical sample was used as it was assumed that it would contain elevated level of schizotypic symptoms (Tiliopoulous & Goodall, 2009), interpersonal functioning difficulties and symptoms of low mood to that of a non-clinical sample. The descriptive statistics (see section 3.4.1) indicated that this assumption was justified. It is the opinion of the Chief Investigator that the elevated scores for the variables provided an optimal means to investigate the hypotheses of the current study, thereby justifying the use of a clinical sample. In relation to the gender ratio in the sample, a potential bias relating to the sample used concerns the over representation of female participants in the sample. In this regard, only twenty-six percent of the sample was male, despite schizotypy being more predominant in this gender. However, with the exception of the Meins *et al.*, (2008) study, the current study did not differ significantly from previous research in regard to the gender balance of the sample. The percentage of males in the sample used in the Berry *et al*. (2006), Meins *et al*., (2008), and Tiliopoulos & Goodall (2009) studies were twenty-

eight percent, forty-four percent, and twenty-nine percent respectively. Furthermore, to ensure that the gender imbalance in the current study had not inserted bias into the results further hierarchical regression analysis were computed with gender added to them. The results of these regression indicated the inclusion of gender changed them non-significantly. Finally, in regard to the power of the sample, it should be noted that the initial power analysis was based on the inclusion of three predictor variables, namely attachment styles, interpersonal functioning and depression. However, the final regression equation used four attachment styles, the eight sub-scales of the IIP-32 and a depression variable. On the basis that the final regression equation contained thirteen independent variables the study may be considered underpowered. A potential limitation of the study regarding the power of the sample involved the number of participants who identified the '*Insecure-Preoccupied'* as their overall attachment styles. However, as noted previously, the current study used the likert scores for each of the four attachment styles for each participant and as a consequence the number of participants who chose '*Insecure-Preoccupied*' as their overall pattern of attachment will not have affected the statistical analysis.

At the time of the thesis proposal the Chief Investigator could only identify three studies which had investigated the association between attachment and schizotypy in the preceding fifteen years. The reasons for the lack of research in this field are unclear, especially when consideration is made to the potential that this research could have in regard to enhancing the scientific understanding into the aetiology, maintenance, prevention and relapse of schizophrenia. The current study should be considered to have made a significant contribution to the psychological research literature for the following two reasons. Firstly, of the previous studies completed that investigate the association between attachment and schizotypy, only one study (Berry *et al*., 2006) included a state measure of interpersonal functioning and none contained a measure of depression. Secondly, and of more pertinence, the current study is the only research to have employed non-linear statistics to investigate the association between attachment and schizotypy. On this basis, the current study should be considered to have made a valuable contribution to an important are of psychological research.

4.7.1 Recommendation for Future Research

Recently, there has been an increased recognition in the literature regarding the central role that deficits in interpersonal functioning have in schizophrenia/psychosis (Berry *et al.,* 2007*).* This has coincided with the observation that deficits in interpersonal domain habitually have a debilitating impact on the quality of life for those individuals who experience the disorder (Berry, 2007). Conversely, it appears that significant aberrations in Cognitive-Perceptual and Disorganised domains can occur without these anomalies necessarily compromising overall well-being and functioning (Claridge *et al*., 1997a).[44]

Discussion regarding the centrality of interpersonal functioning in schizophrenia is tentative at present. Furthermore, the recent emphasis on interpersonal functioning as a cardinal feature of the disorder is not intended to detract from the fact that aberrations in Cognitive-Perceptual and Disorganised domains can/do have a significant impact on well-being and functioning. Presently, it is evident that further research is required to determine the specific associations and causal relations between interpersonal functioning and the other domain factors of schizotypy/schizophrenia.

On this basis, it is recommended that future research should replicate the design of the current study but with the addition of a significantly larger clinical sample. This would facilitate non-linear investigations into the associations between each of the first order schizotypal dimensions in regard to variables attachment, interpersonal functioning and depression. This research could provide further clarity regarding whether the non-linear associations observed in relation to the main finding of the current study are relevant to each of first order schizotypal dimension or exclusive only to specific domains. Research that indicated causal positive associations between interpersonal functioning to each of the first order dimensions in schizotypy/schizophrenia would have important clinical and theoretical implications. In regard to theoretical implications, research that affirmed this association would further support the view that schizotpy/schizophrenia is primarily a disorder characterised by interpersonal difficulties. In relation to clinical implications, research that indicated causal associations between interpersonal functioning to all three

[44] Claridge (1997a) uses the term '*Happy Schizoids*' to refer to individuals who demonstrate good overall levels of well-being and functioning despite significant aberrations in these domains.

domains of schizotypy/schizophrenia would imply that the therapeutic focus of psychological interventions for schizophrenia should be primarily orientated towards addressing deficits in interpersonal functioning. This would be justified not solely on the basis of addressing the debilitating impact these deficits can have on the quality of life of the individual who experiences the disorder, but also as a means to improve global changes in symptoms, particularly in domains of *'Cognitive-Perceptual'* and *'Disorganised',* which traditionally have been treatment resistant.

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APPENDICES

APPENDIX

Copy of DSM –IV (American Psychiatric Association, 1994) Diagnostic Criteria for Schizophrenia:

DSM-IV-TR Diagnostic Criteria for Schizophrenia
A. *Characteristic symptoms:* Two (or more) of the following, each present for a significant portion of time during a 1-month period (or less if successfully treated):
1. delusions
2. hallucinations
3. disorganized speech (e.g., frequent derailment or incoherence)
4. grossly disorganized or catatonic behavior
5. negative symptoms, i.e., affective flattening, alogia, or avolition
Note: Only one Criterion A symptom is required if delusions are bizarre or hallucinations consist of a voice keeping up a running commentary on the person's behavior or thoughts, or two or more voices conversing with each other.
B. *Social/occupational dysfunction:* For a significant portion of the time since the onset of the disturbance, one or more major areas of functioning, such as work, interpersonal relations, or self-care, are markedly below the level achieved prior to the onset (or when the onset is in childhood or adolescence, failure to achieve expected level of interpersonal, academic, or occupational achievement).
C. *Duration:* Continuous signs of the disturbance persist for at least 6 months. This 6-month period must include at least 1 month of symptoms (or less if successfully treated) that meet Criterion A (i.e., active-phase symptoms) and may include periods of prodromal or residual symptoms. During these prodromal or residual periods, the signs of the disturbance may be manifested by only negative symptoms or two or more symptoms listed in Criterion A present in an attenuated form (e.g., odd beliefs, unusual perceptual experiences).
D. *Schizoaffective and Mood Disorder exclusion*: Schizoaffective Disorder and Mood Disorder With Psychotic Features have been ruled out because either (1) no Major Depressive, Manic, or Mixed Episodes have occurred concurrently with the active-phase symptoms; or (2) if mood episodes have occurred during active-phase symptoms, their total duration has been brief relative to the duration of the active and residual periods.
E. *Substance/general medical condition exclusion:* The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition.
F. *Relationship to a Pervasive Developmental Disorder:* If there is a history of Autistic Disorder or another Pervasive Developmental Disorder, the additional diagnosis of Schizophrenia is made only if prominent delusions or hallucinations are also present for at least a month (or less if successfully treated).
Classification of longitudinal course (can be applied only after at least 1 year has elapsed since the initial onset of active-phase symptoms):

Episodic With Interepisode Residual Symptoms (episodes are defined by the reemergence of prominent psychotic symptoms); also specify if: With Prominent Negative Symptoms
Episodic With No Interepisode Residual Symptoms
Continuous (prominent psychotic symptoms are present throughout the period of observation); also specify if: With Prominent Negative Symptoms
Single Episode In Partial Remission; also specify if: With Prominent Negative Symptoms
Single Episode In Full Remission Other or Unspecified Pattern

APPENDIX II

Copy of Inclusion and Exclusion Criteria:

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria

- Patients who have capacity to provide consent;
- Patients who are over the age of 18 years;
- Patients who are under the age of 65 years.

Exclusion Criteria

- Patients who currently present with an acute psychotic disorder such as Schizophrenia or Bipolar Disorder;
- Patients who are not proficient in English at a conversational level;
- Patients who have a Learning Disability;
- Patients who have a Brain Injury;
- Patients who have a Drug and/or Alcohol dependency;
- Patients who have active Suicidal Intent.

APPENDIX III

Copy of Schizotypal Personality Questionnaire:

SCHIZOTYPAL PERSONALITY QUESTIONNAIRE

Please answer each item by checking Y (Yes) or N (No). Answer ***all*** items even if unsure of your answer. When you have finished, check over each one to make sure you have answered them.

		Yes	No
1	*Do you sometimes feel that things you see on the TV or read in the newspaper have a special meaning for you?*		
2	*I sometimes avoid going to places where there will be many people because I will get anxious*		
3	*Have you had experiences with the supernatural?*		
4	*Have you often mistaken objects or shadows for people, or noises for voices*		
5	*Other people see me as slightly eccentric (odd).*		
6	*I have little interest in getting to know other people*		
7	*People sometimes find it hard to understand what I am saying.*		
8	*People sometimes find me aloof and distant.*		
9	*I am sure I am being talked about behind my back.*		
10	*I am aware that people notice me when I go out for a meal or to see a film.*		
11	*I get very nervous when I have to make polite conversation.*		
12	*Do you believe in telepathy (mind-reading)*		
13	*Have you ever had the sense that some person or force is around you, even though you cannot see anyone*		
14	*People sometimes comment on my unusual mannerisms and habits.*		
15	*I prefer to keep to myself.*		
16	*I sometimes jump quickly from one topic to another when speaking.*		
17	*I am poor at expressing my true feelings by the way I talk and look.*		
18	*Do you often feel that other people have got it in for you ?*		
19	*Do some people drop hints about you or say things with a double meaning*		
20	*Do you ever get nervous when someone is walking behind you ?*		
21	*Are you sometimes sure that other people can tell what you are thinking ?*		
22	*When you look at a person, or yourself in a mirror, have you ever seen the face change right before your eyes?*		
23	*Sometimes other people think that I am a little strange.*		
24	*I am mostly quiet when with other people.*		
25	*I sometimes forget what I am trying to say.*		
26	*I rarely laugh and smile.*		
27	*Do you sometimes get concerned that friends or co-workers are not really loyal or trustworthy?*		

		Yes	No
28	*Have you ever noticed a common event or object that seemed to be a special sign for you?*		
29	*I get anxious when meeting people for the first time.*		
30	*Do you believe in clairvoyancy (psychic forces, fortune telling) ?*		
31	*I often hear a voice speaking my thoughts aloud.*		
35	*My "non-verbal" communication (smiling and nodding during a Y N conversation) is poor.*		
36	*I feel I have to be on my guard even with friends.*		
37	*Do you sometimes see special meanings in advertisements, shop windows, or in the way things are arranged around you?*		
38	*Do you often feel nervous when you are in a group of unfamiliar people?*		
39	*Can other people feel your feelings when they are not there ?*		
40	*Have you ever seen things invisible to other people?*		
41	*Do you feel that there is no-one you are really close to outside of your immediate family, or people you can confide in or talk to about personal problems?*		
42	*Some people find me a bit vague and elusive during a conversation.*		
43	*I am poor at returning social courtesies and gestures.*		
44	*Do you often pick up hidden threats or put-downs from what people say or do*		
45	*When shopping do you get the feeling that other people are taking notice of you*		
46	*I feel very uncomfortable in social situations involving unfamiliar people.*		
47	*Have you had experiences with astrology, seeing the future, UFOs, ESP or a sixth sense?*		
48	*Do everyday things seem unusually large or small?*		
49	*Writing letters to friends is more trouble than it is worth.*		
50	*I sometimes use words in unusual ways.*		
51	*I tend to avoid eye contact when conversing with others.*		
52	*Have you found that it is best not to let other people know too much about you?*		
53	*When you see people talking to each other, do you often wonder if they are talking about you?*		
54	*I would feel very anxious if I had to give a speech in front of a large group of people.*		
55	*Have you ever felt that you are communicating with another person telepathically (by mind-reading)?*		
56	*Does your sense of smell sometimes become unusually strong ?*		
57	*I tend to keep in the background on social occasions.*		
58	*Do you tend to wander off the topic when having a conversation.*		
59	*I often feel that others have it in for me.*		
60	*Do you sometimes feel that other people are watching you ?*		
61	*Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?*		
62	*I attach little importance to having close friends.*		
63	*Do you sometimes feel that people are talking about you ?*		
64	*Are your thoughts sometimes so strong that you can almost hear them ?*		
65	*Do you often have to keep an eye out to stop people from taking advantage of you ?*		
66	*Do you feel that you are unable to get "close" to people ?*		
67	*I am an odd, unusual person.*		
68	*I do not have an expressive and lively way of speaking.*		

		Yes	No
69	*I find it hard to communicate clearly what I want to say to people.*		
70	*I have some eccentric (odd) habits.*		
71	*I feel very uneasy talking to people I do not know well.*		
72	*People occasionally comment that my conversation is confusing*		
73	*I tend to keep my feelings to myself.*		
74	*People sometimes stare at me because of my odd appearance.*		
THANK YOU			

APPENDIX IV

Copy of Relationship Questionnaire:

RELATIONSHIP QUESTIONNAIRE

PLEASE READ THE DIRECTIONS!

1. Following are descriptions of four general relationship styles that people often report.

Please read each description and **CIRCLE** the letter corresponding to the style that *best* describes you or is *closest* to the way you generally are in your close relationships.

A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

2. Please rate each of the following relationship styles according to the *extent* to which you think each description corresponds to your general relationship style.

A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

D. I am comfortable without close emotional relationships, It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

	Not at all like me			**Somewhat like me**			**Very much like me**
Style A.	1	2	3	4	5	6	7
Style B.	1	2	3	4	5	6	7
Style C.	1	2	3	4	5	6	7
Style D.	1	2	3	4	5	6	7

APPENDIX V

Copy of the Inventory of Interpersonal Problems - 32 Questionnaire:

APPENDIX VI

Copy of the Beck Depression Inventory-II:

APPENDIX VII

Copy of Demographic Information Questionnaire:

DEMOGRPAHICS INFORMATION QUESTIONNAIRE
(TO BE COMPLETED BY CLINICAN)

AGE:

GENDER:

POST CODE:

RELATIONSHIP STATUS (for example, is the patient married or single?):

OCCUPATION:

PRESENTING PROBLEM(S)/DIAGNOSIS/DIAGNOSES:

NUMBER OF YEARS IN CONTACT WITH MENTAL HEALTH SERVICES:

APPENDIX VIII

Copy of Participant Information Sheet:

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

My name is Colm Dunne and I am required to undertake a project as part of my Doctorate course in Clinical Psychology. I would like to invite you to participate in a research project. However, before you decide whether or not you wish to participate, I need to be sure that you understand firstly, why the research is being completed and secondly, what it would involve if you agreed.

I am therefore providing you with the following information. You do not have to make an immediate decision. Please read it carefully and be sure to ask any questions by either contacting myself Colm Dunne, Trainee Clinical Psychologist or my Clinical Supervisor Dr. Linda Kohn, Clinical Psychologist using the details provided below.

CONTACT DETAILS

If you have queries regarding any aspect of the research now or later please do not hesitate to contact either myself or Dr. Kohn and we will do our best to provide an explanation and any further information you may require.

Colm Dunne, Trainee Clinical Psychologist
PH: 01738 562383.
Email: colm.dunne@nhs.net

Dr. Linda Kohn, Clinical Psychologist
PH: 01738 562383
Email: linda.kohn@nhs.net

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

THE BACKGROUND TO THE RESEARCH

This research looks at the relationship between what mental health professionals call "*Schizotypy*" and "*Attachmen*t". "Schizotypy" means/refers to a certain cluster of personality traits. Everyone is assumed to have some degree of Schizotypic traits. These traits are generally not problematic for people. However, when these traits are higher, then they can contribute to some mental health problems such as Schizophrenia.

Attachment style refers to how we connect and relate to other people. Attachment style can influence our relationships and also how we regulate our feelings/emotions. This research is looking at how Schizotypy and Attachment are related. If we have more information about this then it may help us develop more treatments for mental health problems related to Schizotypy.

This research will be sponsored by the University of Edinburgh and full ethical approval has been granted by the NHS Tayside Ethics committee.

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

WHAT DOES THE STUDY ENTAIL?

No individual will be unfairly excluded from this study. As noted above, each individual is assumed to exhibit some degree of schizotypic traits. Therefore all patients attending psychological services in Tayside are eligible to participate in the current study. However, one exception to this is patients who have alcohol dependency issues.

Participants will be required to allow their clinician to complete the demographic information questionnaire on their behalf. The information required by clinicians to complete this questionnaire is age, gender, post code, relationship status, occupation, presenting problem(s) / diagnosis/diagnoses and length of contact with mental health services. Further to this, the only other requirement of participants will be to complete the enclosed questionnaires. Participants may complete these questionnaires in their own place of choice. Whilst it is convenient to the Chief Investigator that the questionnaires are completed as soon as possible these questionnaires may be returned to their clinician at any time prior to 31.07.11.

All information obtained from the questionnaires will be anonymised and there will be no identifying information reported in the results. All identifiable data will be withdrawn from the study if participants withdraw, however non-identifiable data will be retained. One month after the completion of the research all questionnaires will be shredded and disposed of in NHS confidential waste facilities.

There are no monetary benefits to either the Chief Investigator or the participants, but it is hoped that participants will appreciate the potential role that the research may have in the prevention and treatment of Schizophrenia.

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

WHAT ARE MY RIGHTS?

- Participation is entirely voluntary;

- Participants have the right to withdraw at any time, without there being any expectation or obligation to provide a reason for doing so;

- The decision to participate, to decline to participate or to withdraw from the research will not impact on current or future treatment;

- The complete anonymity of participants will be guaranteed and no identifiable participant information will be entered into the database or reported in the research findings;

- The information provided in the questionnaires will be treated with total confidentiality. The only exception to this will be a situation where a participant states that they have suicidal thoughts and they think they will act on these thoughts. Under these circumstances the Chief Investigator will be ethically and professionally obliged, as a consequence of his duty of care, to breach confidentiality and contact the clinician of the relevant participant to ensure that an appropriate plan for that person's care has been worked out and put in place;

- The data from the current study will not be used in any other research project;

- Participants can contact the Chief Investigator or his Supervisor using the contact details provided, should they require clarification regarding any aspect of the research, or in the event that they no longer wish to participate.

- Participants can be informed of the main results of the study by providing their contact details on the consent form.

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

WHO HAS REVIEWED THE PROJECT?

The Tayside Research Ethics Committee, which has responsibility for scrutinising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections from the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Edinburgh and NHS, whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

WHAT IF THERE IS A PROBLEM?

If you believe that you have been harmed in any way by taking part in this study, you have the right to pursue a complaint and seek any resulting compensation through the University of Edinburgh who are acting as the research sponsor. Details about this are available from the research team.

PARTICIPANT INFORMATION SHEET

ATTACHMENT AND SCHIZOTYPY

Thank you for taking the time to read this information sheet and for considering to take part in this study.

If you do not wish to engage in the current research simply do not return the consent form or questionnaires to your clinician.

If you wish to engage in the current research please read and sign the consent form, complete the enclosed questionnaires and return them to your clinician.

APPENDIX IX

Copy of Consent Form:

CONSENT FORM

	Please Initial
I confirm that I have read and understand the Participant Information Sheet for the above study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily;	
I am aware of the aim of the research;	
I am aware that my participation is entirely voluntary;	
I am aware that I have the right to withdraw at any time, without there being any expectation or obligation to provide a reason for doing so;	
I am aware that not taking part or withdrawing consent to participate at any stage will not impact on my current or future treatment;	
I am aware that participation requires me to complete questionnaires;	
I give permission for my clinician to complete the demographic information questionnaire on my behalf;	
I am aware that the information I provide will be treated in the strictest confidentiality, the only exception to this being a situation where I have suicidal thoughts and think I will act on them;	
I have been provided with the contact details of the Chief Investigator and his Supervisor should I wish to contact them regarding any aspect of the research;	
I understand that all identifiable data will be withdrawn from the study if I withdraw consent but that non-identifiable data will be retained;	

I wish to be informed of the main findings of the research. If yes, please provide postal or email address here:_____; ☐

I understand that relevant sections of my data collected during the study may be looked at by individuals from the University of Edinburgh and NHS Tayside, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records. ☐

Participant name and date (Printed):_____

Participant signature and date:_____

APPENDIX X

Copy of documentation indicating IRAS Approval:

NHS Fife | NHS Forth Valley | NHS Tayside

East of Scotland Research Ethics Service

Tayside Committee on Medical Research Ethics A
Research Ethics Office
Tayside Academic Health Sciences Centre
Ninewells Hospital & Medical School
Residency Block, Level 3
George Pirie Way
Dundee
DD1 9SY

Mr Colm Dunne
Trainee Clinical Psychologist
APTS
Murray Royal Hosptial
Perth
PH27BH

Date: 25 February 2011
Your Ref:
Our Ref: LR/11/S1401/2
Enquiries to: Mrs Lorraine Reilly
Extension: Ninewells extension 40099
Direct Line: 01382 740099
Email: lorraine.reilly@nhs.net

Dear Mr Dunne

Full title of study: **The Association between Schizotypy and Attachment**
REC reference number: **11/S1401/2**

Thank you for your letter of 21 February 2011, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered by a sub-committee of the REC at a meeting held on 25 February 2011.] A list of the sub-committee members is attached.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

The Committee would like clarification on the following points:

In the Participant Information Sheet - please check for typographical errors 'compete' should read 'complete'.

Please clarify how you are matching up the Consent Form with the Questionnaire.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where the only involvement of the NHS organisation is as a Participant Identification Centre (PIC), management permission for research is not required but the R&D office should be notified of the study and agree to the organisation's involvement. Guidance on procedures for PICs is available in IRAS. Further advice should be sought from the R&D office where necessary.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Questionnaire: Demographics Information Questionnaire		
Response to Request for Further Information		21 February 2011
REC application		11 January 2011
Participant Consent Form: Tracked and Clean	2	14 February 2011
Questionnaire: Schizotypal Personality Questionnaire		
Questionnaire: Relationship		
Questionnaire: IIP-32		
Questionnaire: BDI -11		
CV - Dr Linda Kohn		14 December 2010
Psychological therapies Service Eligibility Criteria		01 August 2010
Participant Information Sheet: Tracked and Clean	2	14 February 2011
Protocol		
Evidence of insurance or indemnity		06 December 2010
Investigator CV		14 December 2010
Covering Letter		12 January 2010
Inclusion and Exclusion Criteria		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

11/S1401/2	**Please quote this number on all correspondence**

Yours sincerely

L. Kelly

for **Mrs Sue Roff**
Vice-chair

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments
"After ethical review – guidance for researchers"

Copy to: Gemma Watson, University of Edinburgh
NHS Tayside R&D Office

APPENDIX XI

Copy of Research and Development Approval:

NHS Tayside

23 March 2011

Mr Colm Dunne
Trainee Clinical Psychologist
APTS
Murray Royal Hospital
PERTH
PH2 7BH

Dear Mr Dunne,

R & D MANAGEMENT APPROVAL - TAYSIDE

Title: The association between Schizotypy and Attachment.

Chief Investigator: Mr Colm Dunne **Principal Investigator: Mr Colm Dunne**

Tayside Ref: 2011PZ02 **NRS Ref: N/A**

REC Ref: 11/S1401/2

EudraCT Ref: N/A **CTA Ref: N/A**

Sponsor: University of Edinburgh

Funder: Unfunded

Many thanks for your application to carry out the above project here in NHS Tayside. I am pleased to confirm that the project documentation (as outlined below) has been reviewed, registered and Management Approval has been granted for the study to proceed locally in Tayside.

Approval is granted on the following conditions:-

- ALL Research must be carried out in compliance with the Research Governance Framework for Health & Community Care, Health & Safety Regulations, data protection principles, statutory legislation and in accordance with Good Clinical Practice (GCP).
- All amendments to be notified to TASC R & D Office.
- All local researchers must hold either a Substantive Contract, Honorary Research Contract, Honorary Clinical Contract or Letter of Access with NHS Tayside where required (http://www.nihr.ac.uk/systems/Pages/systems_research_passports.aspx).
- TASC R & D Office to be informed of change in Principal Investigator, Chief Investigator or any additional research personnel locally.
- Notification to TASC R & D Office of any change in funding.

Version 2 – 26/11/10

- As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until destruction of this data.
- Recruitment numbers on a quarterly basis to be reported to TASC R & D Office.
- Annual reports are required to be submitted to TASC R & D Office with the first report due 12 months from date of issue of this management approval letter and at yearly intervals until completion of the study.
- Notification of early termination within 15 days or End of Trial within 90 days followed by End of Trial Report within 1 year to TASC R & D Office.
- You may be required to assist with and provide information in regard to audit and monitoring of study.

Please note you are required to adhere to the conditions, if not, NHS management approval may be withdrawn for the study.

Approved Documents

Document	Version	Date
IRAS SSI Form (67827/179070/6/445/86681/201737)		20/12/10
IRAS R&D Form (67827/179066/14/276)		20/12/10
CV – Colm Dunne		14/12/10
CV – Linda Kohn		14/12/10
Ethics – Evidence of Compliance		04/03/11
Ethics – Favourable Opinion		25/02/11
IRAS REC Form (67827/179010/1/581)		20/12/10
PIS	3	01/03/11
Consent Form	2	14/02/11
Demographics Information Questionnaire		
Schizotypal Personality Questionnaire		
Relationship Questionnaire		
IIP-32		
BDI-II		
Inclusion and Exclusion Criteria		
NHS Tayside Psychological Therapies Service Eligibility Criteria		August 2010
Statement on Indemnity Arrangements and Sponsorship – University of Edinburgh		06/12/10
Protocol		

May I take this opportunity to wish you every success with your project.

Please do not hesitate to contact TASC R & D Office should you require further assistance.

Yours sincerely

Elizabeth Coote
R&D Manager

TAyside medical **S**cience **C**entre (TASC)
Ninewells Hospital & Medical School
TASC Research & Development Office
Residency Block, Level 3
George Pirie Way
Dundee DD1 9SY
Email: liz.coote@nhs.net
Tel: 01382 496536 Fax: 013812 496207

c.c. Dr Matthias Schwannauer
Tayside Committee on Medical Research Ethics A
Sponsor Representative – Miss Gemma Watson

APPENDIX XII

Descriptive Statistics for Sub-Scales of SPQ:

Sub-scales for SPQ	Range	Minimum	Maximum	Mean	Std. Deviation
SPQ: Cog-Per					
Ideas of reference	9.00	.00	9.00	2.56	2.38
Odd Beliefs	5.00	.00	5.00	1.18	1.36
Unusual perceptual exp	9.00	.00	9.00	2.15	2.28
SPQ: Inter					
Social Anxiety	8.00	.00	8.00	5.3	2.63
Suspiciousness (S)	8.00	.00	8.00	3.40	2.41
No close friends	9.00	.00	9.00	4.20	2.70
Constricted affect	8.00	.00	8.00	2.97	2.13
SPQ: Dis					
Odd Behaviour	7.00	.00	7.00	1.79	2.2
Odd Speech	9.00	.00	9.00	3.62	2.50

	Skewness		Kurtosis	
	Statistic	**Std. Error**	**Statistic**	**Std. Error**
SPQ: Cog-Per				
Ideas of reference	.72	.30	-.33	.58
Odd Beliefs	.95	.30	-.10	.58
Unusual perceptual experiences	1.05	.30	.47	.58
SPQ: Inter				
Social Anxiety	-.59	.30	-1.1	.58
Suspiciousness (S)	.24	.30	-1.17	.58
No close friends	.11	.30	-.94	.58
Constricted affect	.30	.30	-.67	.58
SPQ: Dis				
Odd Behaviour	1.0	.30	-.18	.58
Odd Speech	.23	.30	-.98	.58

APPENDIX XIII

Table of correlations for Attachment Styles and Sub-Scales of IIP-32:

	H. Sociable	H. Assertive	T. Aggressive	T. Open	T. Caring	H. Supportive	Hard. Involved	T. Dependent
Secure	**-.34****	**-.38****	**-.29***	**-.28***	.03	-.21	**-.29***	-.21
Insecure-Fearful	**.43****	**.34****	.20	.23	.19	.19	**.30***	.21
Insecure - dismissing	.10	.16	.14	**.37****	-.02	**.34****	**.25***	.03
Insecure - preoccupied	**.29***	**.26***	**.35****	.09	.20	-.24	.12	**.30***

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

APPENDIX XIV

Table of correlations for BDI-II and Sub-Scales of IIP-32:

	Hard to be Sociable	Hard to be Assertive	Too Aggressive	Too Open	Too Caring	Hard to be Supportive	Hard to be Involved	Too Dependent
BDI-II	.35**	.44**	.20	.20	.29*	.39**	.43**	.30*

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

Ignore

(M. D. S. Ainsworth, 1967; M. D. S. Ainsworth & Wall, 1978; M. S. Ainsworth & Bowlby, 1991; Aldao et al., 2010; Allardyce et al., 2007; Andreasen et al., 2005; Andrews & Peters, 1998; Baca-Garcia et al., 2007; Bak et al., 2005; Barrowclough et al., 2003; Bartholomew & Horowitz, 1991; Bebbington & Nayani, 1995; Beck, 1979; R. Bentall, 2006; R. P. Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001; Berry, Barrowclough, & Wearden, 2007; Berry, Wearden, Barrowclough, & Liversidge, 2006; Bowlby, 1960, 1969, 1973, 1979, 1980, ; Brackett, 2006; Brennan, Clark, & Shaver, 1998; Bretherton, 1992; Brown & Barlow, 2005; Claridge, 1997a, 1997b; Claridge & Davis, 2003; Clark, 1993; Craddock et al., 2005; Craddock & Owen, 2007; De Clercq, De Fruyt, & Widiger, 2009; Diamond & Aspinwall, 2003; Diamond & Fagundes, 2008; Dikeos et al., 2006; Dozier, Lomax, Tyrrell, & Lee, 2001; Dutta et al., 2007; Eysenck & Eysenck, 1976; Fairburn, Cooper, & Shafran, 2003; Fenigstein & Vanable, 1992; Fenton & McGlashan, 1991; First, Spitzer, Gibbon, & Williams, 1995; Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007; Fraley, 2002; Freeman, 2007; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001; Glaser, 2000; Goldman-Rakic, 1995; Goodwin, 2003; M. J. Green, Boyle, & Raine, 2008; Griffin & Bartholomew, 1994; Hamilton, 2000; Hamshere et al., 2005; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hazan & Shaver, 1987; Hegarty, Baldessarini, Tohen, Waternaux, & Oepen, 1994; Horowitz, Rosenberg, & Bartholomew, 1993; James, 2005; Johns et al., 2004; Johns & van Os, 2001; Kamphuis & Noordhof, 2009; Larsen, 2000; Linehan, 1993; Main, Kaplan, & Cassidy, 1985; Manassis, Bradley, Goldberg, Hood, & SWINSON, 1994; Markiewicz, Lawford, Doyle, & Haggart, 2006; Masten, 2001; McDonald et al., 2005; Meehl, 1990; Meins, Jones, Fernyhough, Hurndall, & Koronis, 2008; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007; Meyer, Pilkonis, Proietti, Heape, & Egan, 2001; Mikulincer & Shaver, 2007; Mikulincer, Shaver, & Pereg, 2003; Mikulincer & Sheffi, 2000; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Pietromonaco & Barrett, 2000; Raine, 1991; Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2009; Read, Os, Morrison, & Ross, 2005; Rössler et al., 2007; Schore, 2001; Shaver & Mikulincer, 2002; Tasca et al., 2009; Teasdale & Barnard, 1995; Tiliopoulos & Goodall, 2009; van Ijzendoorn & Bakermans-Kranenburg, 2008; VAN, 1999; Van Os, 2003; van Os, Hanssen, Bijl, & Ravelli, 2000; Van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009; Verheul, 2005; Wearden, Peters, Berry, Barrowclough, & Liversidge, 2008; Wei, Vogel, Ku, & Zakalik, 2005; Widiger, 1992; Widiger & Samuel, 2005; ZAMMIT & LEWIS, 2004; Zubin & Spring, 1977)

(Dancey & Reidy, 2008) (Field, 2009) (Cohen, 1992)

(Hair, 2010; Myers, 1990)